

TECHNICAL MEMORANDUM MARCH 2001 GROUNDWATER MONITORING REPORT

AMERICAN CHEMICAL SERVICE SUPERFUND SITE GRIFFITH, INDIANA

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EXECUTIVE SUMMARY

The approved long term groundwater monitoring plan at the American Chemical Service, Inc. (ACS) National Priorities List (NPL) Site in Griffith, Indiana, consists of semi-annual sampling of the 44 wells in the monitoring network. In addition, three of the monitoring wells, MW48, MW49, and MW9R are sampled on a quarterly basis and up to five private wells in the vicinity of the Site are sampled once each year. For one of the semi-annual sampling events, the monitoring well samples are analyzed for the full Target Compound List (TCL) and Target Analyte List (TAL) parameters. For the other major sampling event, and the minor sampling events, the samples are analyzed for a reduced list of indicator parameters. Each quarter, water levels are measured at all monitoring network points in a single 24-hour period.

This Technical Memorandum summarizes the March 2001 groundwater monitoring activities at the ACS NPL Site. The March event consisted of a minor sampling event, plus the sampling of four additional wells, MW06, MW10C, ATMW4D, and MW56. The samples from wells MW06, MW48, MW49, and MW09R were analyzed for the reduced list of indicator parameters, while MW10C, ATMW4D, and MW56 were analyzed for indicator volatile organic compounds (VOCs). All sampling activities and analyses were conducted in accordance with the September 1997 U.S. Environmental Protection Agency (U.S. EPA) approved sampling plan.

In the upper aquifer in the vicinity of the ACS facility, the regional groundwater flow is from east to west. At the ACS Site, the flow is diverted to the north and to the south by the barrier wall, installed as part of the ACS final remedy. The potentiometric surface to the northwest of the Site (including the wetland area) is relatively flat due to the effects of the Perimeter Groundwater Containment System (PGCS) trench, barrier wall, and discharge points from the groundwater treatment plant effluent. In the lower aquifer, groundwater flow is northward with a hydraulic gradient of 0.00047. This gradient and flow direction are consistent with previous lower aquifer data presented in earlier groundwater technical memoranda.

Vertical gradients were calculated across the upper and lower aquifers and within the lower aquifer. All gradients were consistent with previous findings. Downward vertical gradients were observed between the upper and lower aquifer. Vertical gradients measured in the lower aquifer were small and variable; of the calculated gradients in the lower aquifer, three were downward, two were upward, and two were within uncertainty limits. Consistent vertical gradient trends are seen in three well nests within the lower aquifer: downward at MW52/MW53 and MW54R/MW55, and upward at MW9R/MW34. This variability indicates that there is not an overall trend in vertical gradient data in the lower aquifer.

Groundwater sampling within the upper aquifer was conducted at three monitoring wells, MW06, MW48, and MW49, during the March 2001 event. Detections of VOCs and inorganics were compared to the maximum baseline concentrations for each well. Concentrations of benzene and arsenic concentrations at MW06 exceeded baseline levels,

but were within range of previous detections during first quarter sampling events, which are usually higher than in other seasons. The baseline concentrations of benzene, chloroethane, arsenic, and lead were not exceeded in samples from the other upper aquifer wells during March 2001.

Three lower aquifer wells were sampled during March 2001. There were no baseline exceedances of arsenic or lead in the samples from lower aquifer wells. Concentrations of chloroethane and benzene in MW9R were below baseline concentrations and have decreased over the last two sampling events. These concentrations appear to be continuing their downward trend since monitoring well MW9 was replaced. Benzene was detected above baseline concentrations in the groundwater sample from MW10C. While benzene and chloroethane concentrations at ATMW4D have increased during the last several sampling events, they decreased in March 2001. After the March 2001 sampling round, well ATMW4D was abandoned and replaced by MW56 on April 5, 2001. A separate letter has been prepared to address this activity. Well MW56 was sampled for VOCs on April 19, 2001, and was non-detect for benzene and chloroethane.

A separate report will be submitted that includes a discussion and data evaluation for the groundwater treatment system effluent samples.

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ACRONYMS AND ABBREVIATIONS

1,2-DCE 1,2-dichloroethene

ACS American Chemical Service, Inc.
BWES Barrier Wall Extraction System

DCE 1,1-dichlorethene DO dissolved oxygen

LTGMP Long Term Groundwater Monitoring Plan

NPL National Priorities List
ORC Oxygen Release Compound
ORP oxidation-reduction potential
PCBs Poly-chlorinated biphenyls

PCE tetrachloroethene

PGCS Perimeter Groundwater Containment System

QAPP Quality Assurance Project Plan
RD/RA Remedial Design/Remedial Action
SOP specific operating procedures
SVOCs Semivolatile Organic Compounds

TAL Target Analyte List
TCA 1,1,1-trichloroethane
TCE trichloroethene

TCL Target Compound List

TIC tentatively identified compounds

 μ g/L micrograms per liter

U.S. EPA United States Environmental Protection Agency

UST Underground storage tank

VC vinyl chloride

VOCs Volatile Organic Compounds

1.0 INTRODUCTION

1.1 LONG TERM GROUNDWATER MONITORING PLAN

The long-term groundwater monitoring plan (LTGMP), approved by U.S. Environmental Protection Agency (U.S. EPA) in September 1997, for the American Chemical Service, Inc. (ACS) National Priorities List (NPL) Site in Griffith, Indiana, consists of two major (semi-annual) sampling events each year and two minor sampling events. The major sampling events consist of sample collection at 44 monitoring wells in the monitoring network. For one of the semi-annual sampling events, the groundwater samples are analyzed for full scan Target Compound List and Target Analyte List (TCL/TAL) parameters. For the other semi-annual sampling event, the samples are analyzed for a reduced list of indicator parameters. The indicator parameters include eight volatile organic compounds (VOCs) and two metals: tetrachloroethene (PCE), trichloroethene (TCE), 1,1,1-trichloroethane (TCA), 1,1-dichloroethene (DCE), 1,2-dichloroethene (1,2-DCE), vinyl chloride (VC), chloroethane, benzene, arsenic, and lead.

The minor sampling event includes sampling three monitoring wells within the monitoring network, which have shown variable contaminant concentrations during the baseline sampling. These include upper aquifer monitoring wells MW48 and MW49, and lower aquifer monitoring well MW9R. Samples from these monitoring wells are analyzed for indicator parameters.

During each of the four annual sampling events, water levels are collected from the full monitoring network prior to collecting groundwater samples. These measurements are conducted within a 24-hour period and used to construct hydraulic gradient maps and tables.

Once annually, samples are to be collected from up to five private wells and analyzed for the full scan TCL/TAL parameters. This private well sampling has generally been conducted concurrently with the third groundwater monitoring event.

1.2 OBJECTIVES AND SCOPE OF MARCH 2001 SAMPLING

The March 2001 sampling event was a minor sampling event, with sample collection at seven monitoring wells. Samples from MW06, MW48, MW49, and MW09R were analyzed for indicator parameters, while samples from MW10C, MW56, and ATMW4D were analyzed for indicator VOCs only. The following objectives from the long term groundwater monitoring plan apply to the quarterly sampling at the ACS NPL Site.

1. Collect water level data to monitor groundwater flow in the upper and lower aquifers and calculate the hydraulic gradients between the aquifers.

- 2. Collect water level data to document the performance of the Perimeter Groundwater Containment System (PGCS) and Barrier Wall Extraction System (BWES) and to evaluate changes in the groundwater flow system resulting from the remedial actions (these activities are outlined in the Performance Standard Verification Plan, April 1997). The Groundwater Treatment Plant Quarterly Monitoring Report is submitted under separate cover and includes information on this objective.
- 3. Collect and analyze groundwater samples from the interior of the areas of contaminated groundwater to document how concentrations change with time and in response to the remedial actions.
- 4. Assess progress toward attaining cleanup objectives in contaminated areas.

1.3 ORGANIZATION OF TECHNICAL MEMORANDUM

The results of the March 2001 groundwater monitoring activities at the ACS NPL Site are presented in the following sections of this report:

- Section 1 Objectives and scope of the groundwater monitoring activities
- Section 2 Field data collection activities
- Section 3 Evaluation of the March 2001 sampling data
- Section 4 Conclusions

Tables, figures and appendices are presented at the end of this report.

A baseline sampling report was completed following the September 1997 sampling event and included a LTGMP. In accordance with the U.S. EPA-approved Groundwater Monitoring Plan, this Technical Memorandum compares the March 2001 groundwater analytical results to the highest detected concentrations observed for each well and parameter during the baseline sampling. This comparison table is found in Appendix A.

2.0 FIELD DATA COLLECTION ACTIVITIES MARCH 2001

Field activities were conducted on March 27 and 28, and April 19, 2001 at the ACS Site. The groundwater monitoring activities were conducted in accordance with the U.S. EPA-approved Specific Operating Procedures (SOPs), the Pre-Design Quality Assurance Project Plan (QAPP) submitted in August 1995, and U.S. EPA comments regarding the Pre-Design QAPP. All monitoring wells were purged and sampled using low-flow methods in accordance with the approved Monitoring Well Sampling Proposal and Protocol SOP for the Upper Aquifer Investigation (Revision: July 25, 1996). The March 2001 groundwater sampling event consisted of the following activities:

- Measurement of water levels in 130 upper and lower aquifer wells, piezometers, and staff gauges on March 27, 2001.
- Upper aquifer monitoring: collection of groundwater samples from three monitoring wells and analyses for indicator parameters on March 28, 2001.
- Lower aquifer monitoring: collection of groundwater samples from four monitoring wells and analysis for indicator parameters or indicator VOCs on March 28 and April 19, 2001.

2.1 WATER LEVELS

Water level measurements were collected at upper and lower aquifer wells, piezometers, and surface water staff gauges on March 27, 2001. The water level measurements were utilized to determine horizontal and vertical gradients in the lower aquifer, and to calculate vertical gradients between the aquifers. Table 1 contains water level measurements, map coordinates (reference points), top of inside well casing elevations, and calculated groundwater elevations for the measurement points.

2.2 GROUNDWATER SAMPLING

Prior to sampling the monitoring wells, each well was purged using low-flow methods in accordance with the U.S. EPA approved Monitoring Well Sampling SOP of the Upper Aquifer Investigation (revision: March 21, 1997). Field parameters (pH, specific conductivity, temperature, dissolved oxygen (DO), oxidation-reduction potential (ORP), and turbidity) were measured and recorded during well purging activities. Table 2 presents a summary of the field parameter results.

The groundwater samples were sent overnight under chain-of-custody to CompuChem Laboratory, Cary, North Carolina, where they were analyzed for the indicator parameters summarized in Tables 3 and 4. The tables provide well identification, well screen depth (lower aquifer only), well location, and monitoring parameters.

3.0 EVALUATION OF MARCH 2001 SAMPLING DATA

3.1 GROUNDWATER FLOW SYSTEM DATA

The groundwater elevations listed in Table 1 were used to develop water table and potentiometric surface maps for the upper and lower aquifers. Additionally, the horizontal hydraulic gradient was calculated for the lower aquifer and vertical hydraulic gradients were calculated within the lower aquifer and between the upper and lower aquifers. The following sections present and discuss the general flow directions in the upper and lower aquifers and the calculated gradients.

3.1.1 Groundwater Flow in the Upper Aquifer

The upper aquifer matrix is homogeneous silty sand with no evidence of interlayering or bedding complexities. Many years of groundwater flow monitoring have shown that the natural regional groundwater flow in this aquifer is westward. The barrier wall, completed in 1997, diverts the groundwater flow to the north-northwest and to the south-southeast.

Figure 1 presents the upper aquifer water table elevations from data collected on March 27, 2001. Due to the large number of data points (6 staff gauges, 24 wells, and 98 piezometers were used), little interpolation was required to develop detailed contour plots. Since the Remedial Investigation in 1991, all water table maps developed for the ACS Site have shown the same general groundwater flow patterns. The gradient to the northwest of the site is relatively flat due to the affects of the PGCS trench, barrier wall, and discharge points from the groundwater treatment plant. These discharge points are located near MW46 in the wetlands, and are labeled 1, 2, and 3 as shown in Figure 1.

3.1.2 Groundwater Flow in the Lower Aquifer

Figure 2 presents the potentiometric surface map for the lower aquifer. The groundwater flow in the lower aquifer is northward, consistent with historical groundwater data. The horizontal hydraulic gradient in the lower aquifer was calculated using the measured difference in head between MW50, located south of the Site, and MW52, located northwest of the Site in the wetlands. This difference, 1.15 feet on March 27, 2001, was divided by the lateral distance between the two wells (2,429 feet). Based on this calculation, the horizontal hydraulic gradient in the lower aquifer is 0.00047. This is consistent with the relatively low gradients historically calculated for the lower aquifer, as summarized below.

Report of Hydraulic Gradient in	Horizontal Hydraulic Gradient	
Technical Memorandum	(October 1995)	0.00041
Lower Aquifer Tech Memo	(September 1996)	0.00047
Groundwater Monitoring Report	(August 1996)	0.00047
Groundwater Monitoring Report	(November 1996)	0.00049
Groundwater Monitoring Report	(March 1997)	0.00040
Groundwater Monitoring Report	(June 1997)	0.00044
Groundwater Monitoring Report	(September 1997)	0.00035
Groundwater Monitoring Report	(December 1997)	0.00039

Report of Hydraulic Gradient in	Horizontal Hydraulic Gradient	
Groundwater Monitoring Report	(June 1998)	0.00042
Groundwater Monitoring Report	(September 1998)	0.00029
Groundwater Monitoring Report	(December 1998)	0.00024
Groundwater Monitoring Report	(March 1999)	0.00033
Groundwater Monitoring Report	(June 1999)	0.00038
Groundwater Monitoring Report	(September 1999)	0.00035
Groundwater Monitoring Report	(November 1999)	0.00030
Groundwater Monitoring Report	(March 2000)	0.00039
Groundwater Monitoring Report	(June 2000)	0.00041
Groundwater Monitoring Report	(September 2000)	0.00041
Groundwater Monitoring Report	(November 2000)	0.00049
March 2001 Groundwater Monitor	0.00047	
	Average	0.00040

3.1.3 Vertical Gradients in the Lower Aquifer

Seven nested well sets are screened in the lower aquifer. At each location, there are two or three monitoring wells and/or piezometers, each screened at a different depth within the lower aquifer. The depth intervals include the upper portion, the middle portion, and the lower portion.

The water level elevations (Table 1) were used to calculate vertical hydraulic gradients in the lower aquifer at each location. Table 5 summarizes the calculated vertical gradients from March 2001, which are shown in their historical context in the following tabulation:

Well/Piezometer	Mar	June	Sept	Nov	Mar	June	Sept	Nov	March
Nest	1999	1999	1999	1999	2000	2000	2000	2000	2001
MW7/PZ44	WU	WU	-0.0016	0.0064	-0.0016	-0.1208	WU	-0.0024	WU
MW8/MW32	0.0011	-0.0007	0.0227	WU	0.0017	-0.0009	0.0013	-0.0007	0.0216
MW9R/MW34	WU	0.0037	0.0040	0.0037	0.0040	0.0035	0.0035	0.0035	0.0021
MW30/MW33	WU	-0.0058	WU	-0.0005	WU	-0.0063	-0.0016	0.0021	-0.0011
MW28/PZ43	0.0011	0.0025	0.0140	0.0029	-0.0012	-0.0025	WU	0.0021	WU
MW52/MW53	-0.0012	-0.0008	-0.0002	-0.0008	-0.0010	-0.0010	-0.0004	-0.0006	-0.0008
MW54R/MW55	-0.0069	-0.0077	-0.0071	-0.0020	-0.0055	-0.0061	-0.0081	-0.0065	-0.0073

Notes:

WU= Within uncertainty of measurement technique.

NA = A water elevation necessary for the calculation was not available.

Negative value indicates downward gradient.

Of the calculated vertical gradients across the lower aquifer, three were downward, and two were upward, and two were within the uncertainty of the measurement technique. Consistent downward vertical gradients are observed at well nests MW52/MW53, and MW54R/MW55, and consistent upward vertical gradients are observed at well nest MW9R/MW34. The total tabulation indicates a small, generally downward gradient at most locations.

3.1.4 Vertical Gradient Between Upper and Lower Aquifer

Water level elevations from upper and lower aquifer monitoring points were utilized to calculate the vertical hydraulic gradient between the two aquifers at three locations (P28/MW8, P27/MW9R, and P8/MW7). Vertical gradients were calculated by dividing the difference in head between the upper and lower aquifer wells by the thickness of the clay-confining layer between the two wells. These are summarized in Table 6. The gradients at these locations are consistent with previous findings. The results show that there is a relatively strong downward gradient from the upper aquifer to the lower aquifer.

3.2 MONITORING WELL SAMPLE DATA

Groundwater samples were collected from monitoring wells MW06, MW48, MW49, MW09R, MW10C, MW56, and ATMW4D during the March 2001 sampling event. All samples were analyzed for indicator VOC parameters (PCE, TCE, TCA, DCE, 1,2-DCE, VC, chloroethane, and benzene), with samples from monitoring wells MW06, MW48, MW49, and MW09R also analyzed for indicator metals (arsenic and lead). The laboratory results were validated in accordance with U.S. EPA Region V guidelines, U.S. EPA Contract Laboratory Program National Functional Guidelines For Organic Data Review (1994) and Inorganic Data Review (1994). Validation narratives and laboratory analytical reports for samples from the upper aquifer and the lower aquifer are provided in Appendices C and D, respectively.

The analytical results for the March 2001 quarterly sampling event were evaluated for evidence of contaminant migration, changes in contaminant concentrations over time in response to remedial actions, and the presence of contaminants in the lower aquifer. The analytical results are summarized in tabular form in Appendix A. Time trend plots for the six monitoring wells are presented in Appendix B. The following sections summarize the results of the organic analyses in the upper aquifer (Section 3.2.1), the organic analyses in the lower aquifer (Section 3.2.2), and the inorganic analyses in both aquifers (Section 3.2.3).

3.2.1 Groundwater Sampling Results in the Upper Aquifer

The Site source areas are currently contained within the barrier wall, which prevents migration of contaminants to adjacent areas. Because of this, the groundwater monitoring program is focused on the adjacent areas not confined by the barrier wall. The monitored areas are: the areas north and west of the ACS Facility, referred to as the North Area; the area south/southeast of Colfax Avenue, referred to as the South Area; and the Town of Griffith Landfill, which covers the area to the southwest of the ACS Site. Three upper aquifer wells, MW06, MW48, and MW49 were sampled for this minor sampling event. Wells MW48 and MW49 are located within the plume in the North Area, and MW06 is located within the plume in the South Area. Table 8 presents a summary of indicator organic compounds detected in groundwater samples collected from these three upper aquifer wells.

3.2.1.1 Volatile Organic Compounds

The impact to groundwater in the North Area is comprised primarily of chloroethane and benzene. These compounds were detected in interior wells MW48 and MW49, but did not exceed maximum baseline concentrations during the March 2001 sampling event. Furthermore, concentrations of benzene and chloroethane in these wells continue to show decreasing trends. No other VOCs were detected during this sampling event. The following table summarizes historical benzene and chloroethane detections in MW48 and MW49:

Monitoring Wells MW48 and MW49 (Upper Aquifer)

Monitoring Well	W48	MW49		
Sampling Date	Benzene	Chloroethane	Benzene	Chloroethane
Baseline Value	9,500	1,000	6,750	715
August 1996	9,100	1,000	5,000	480
March 1997	5,200	620	1,600	310
June 1997	7,700	670	4,800	540
September 1997	9,500	980	8,200	810
December 1997	3,800	300	3,300	250
June 1998	9,500	720	4,500	450
September 1998	7,800	610	4,700	650
December 1998	5,500	420	4,200	440
March 1999	1,900	83	1,900	180
June 1999	5,700	290	2,600	220
September 1999	5,400	290	2,200	210
November 1999	2,400	140	2,400	260
March 2000	220	24	530	91
June 2000	3,800	160	ND	ND
September 2000	4,100	100	630	220
November 2000	1,100	78	610	190

Notes:

All concentrations in micrograms per liter (µg/L)

ND = Not detected

Since concentrations of benzene and chloroethane at MW06 have historically been high during the first quarter, this well was included in the March 2001 sampling event. Concentrations of benzene at MW06 exceeded the baseline levels during March 2001. The concentrations of benzene and chloroethane detected at well MW06 have fluctuated over time. Although concentrations of benzene and chloroethane have increased since the last sampling event, this does not represent a new high concentration level. Concentrations at MW06 during the baseline were lower than those observed during the Remedial Investigation (1,500 µg/L benzene). This is because relatively clean water had mounded in a UST excavation in 1994 and 1995, prior to and during the baseline sampling. This mounding contributed to dilution in the upper aquifer and so the baseline sampling results were not representative of the background concentrations in the vicinity of MW06.

Furthermore, the groundwater flow direction has changed since completion of the Barrier Wall in July 1997. Groundwater reaching MW06 is coming from the northeast (Figure 1). This is directly downgradient from the Reder Road, Colfax Avenue intersection, an area that showed elevated concentrations of benzene during the Tracer Investigation.

Monitoring Well MW06 (Upper Aquifer)

Sampling Date	Benzene	Chloroethane
Baseline Value	320	720
May 1990	1,500	240
December 1994	3,000	530
November 1996	320	720
March 1997	35	67
June 1997	39	140
September 1997	140	140
December 1997	1,900	550 J
June 1998	72 J	350 J
December 1998	930	840
June 1999	180	78
November 1999	480	310
March 2000	2,100	420 J
September 2000	130	22
March 2001	2,000	270

Notes:

All concentrations in µg/L.

The proposed response to the exceedance at MW06 is to continue monitoring at this well.

Figure 3 summarizes the VOC detections in samples from monitoring wells MW06, MW48, and MW49 on a map of the ACS Site. Time trend plots for these compounds are found in Appendix B.

3.2.1.2 Semi-Volatile Organic Compounds

Semivolatile organic compounds (SVOCs) were not analyzed as part of the March 2001 groundwater monitoring activities within the upper aquifer in accordance with the approved Groundwater Monitoring Plan.

3.2.1.3 Pesticides and Polychlorinated Biphenyls

Pesticides and polychlorinated biphenyls (PCBs) were not analyzed as part of the March 2001 groundwater monitoring activities within the upper aquifer in accordance with the approved Groundwater Monitoring Plan.

3.2.1.4 Tentatively Identified Compounds

Three VOC tentatively identified compounds (TICS) were detected in upper aquifer monitoring well MW06 during the March 2001 sampling event. Ether, 1,2-dimethylbenzene, and 3,3,5-trimethcyclohexanone were detected at low, estimated

Groundwa	ter Moni	itoring l	Report

J qualifier indicates concentration is estimated.

concentrations. These results are consistent with previous results at these locations. The TIC results are compiled in Appendix C with the analytical results.

3.2.2 Groundwater Sampling Results from the Lower Aquifer

Table 8 presents a summary of indicator organic compounds detected in groundwater samples collected from three lower aquifer monitoring wells during the March 2001 sampling event.

3.2.2.1 Volatile Organic Compounds

Benzene and chloroethane were the only VOCs detected during the March 2001 sampling event, and both compounds were detected at all four monitoring wells MW56, ATMW4D, MW09R, and MW10C. Figure 4 summarizes the VOC detections in groundwater samples collected from lower aquifer monitoring wells on a map of the ACS Site. Below is a discussion of these detections.

Monitoring Well MW09/MW09R

Benzene and chloroethane concentrations at MW09R were below maximum baseline concentrations in March 2001. Benzene and chloroethane concentrations have decreased over the last several sampling events. The following tabulation shows how the concentrations of benzene and chloroethane have decreased since the original MW09 was replaced with MW09R:

Sampling Date	Benzene	Chloroethane
Baseline Value	310	2900
March 1997	310	2900
June 1997	280	1700
September 1997	. 290	1800
December 1997	260	2000
June 1998*	110	1400
September 1998*	100	2000
December 1998*	160	2300
March 1999*	130	760
June 1999*	160	490
September 1999*	120	650
November 1999*	160	540
March 2000*	120	460
June 2000*	60	660
September 2000*	65	970
November 2000*	55	710
March 2001*	42	360

Notes:

All concentrations in micrograms per liter (µg/L)

^{*}Sample collected from replacement well MW09R

Monitoring Well MW10C

Benzene concentrations at MW10C exceeded the maximum baseline concentrations in the March 2001 sampling event. Concentrations of benzene and chloroethane have commonly fluctuated over the last several years. However, concentrations of benzene have increased significantly over the last few sampling events, although they decreased somewhat since the November 2000 sampling event. The following tabulation shows the historical concentrations of benzene and chloroethane at MW10C.

Sampling Date	Benzene	Chloroethane
Baseline Value	150	420
May 1990	ND	ND
January 1995	ND	ND
November 1996	ND	120
March 1997	ND	140
June 1997	ND	440
September 1997	ND	420
December 1997	ND	160
June 1998	ND	160
December 1998	66	150
June 1999	2,000	2,600
September 1999	83	88
November 1999	340	360
March 2000	120	180
June 2000	150	160
September 2000	520	630
November 2000	1800	140
March 2001	410	190

Notes:

All concentrations in micrograms per liter (µg/L)

ND = Not detected

Monitoring Well ATMW4D/MW56

Monitoring well ATMW4D was installed in September 1985 by ACS. This well was not included in the baseline sampling events and therefore there is no baseline for comparison. It has now been sampled seven times since 1998, and concentrations of benzene in the groundwater samples from this well have increased significantly since March 2000. During April 2-6, 2001, ATMW4D was abandoned and replaced with MW56. Below is a tabulation showing the sampling results for monitoring well ATMW4D, with the results for MW56, which was sampled on April 19, 2001:

Sampling Date	Benzene	Chloroethane
December 1998	ND	ND
June 1999	ND	ND
November 1999	3	9

Sampling Date	Benzene	Chloroethane
March 2000	12	34
September 2000	1,200	88
November 2000	3,500	120
March 2001	1,800	42
April 2001*	ND	ND

Notes:

All concentrations in micrograms per liter (µg/L)

ND = Not detected

3.2.2.2 Semi-Volatile Organic Compounds

Semi-volatile organic compounds were not analyzed as part of the March 2001 groundwater monitoring activities within the lower aquifer in accordance with the approved Groundwater Monitoring Plan.

3.2.2.2 Pesticides and Polychlorinated Biphenyls

Pesticides and PCBs were not analyzed as part of the March 2001 groundwater monitoring activities within the lower aquifer in accordance with the approved Groundwater Monitoring Plan.

3.2.2.4 Tentatively Identified Compounds

Three VOC TICs were detected in the groundwater sample from lower aquifer monitoring wells MW09R and MW10C during March 2001. Ether was detected at MW09R and MW10C, at concentrations of 18 and 2,600 μ g/L respectively. Ether was also detected at MW56 at 7 μ g/L. Tetrahydrofuran and 3,3,5-trimethcyclohexanone were detected in MW10C at low estimated concentrations. These detections are similar to the detections during previous sampling events at these locations. The TIC results are compiled in Appendix D with the analytical results.

3.2.3 Inorganic Chemical Species

Monitoring wells MW06, MW48, MW49, and MW09R were sampled and analyzed for indicator metals (arsenic and lead) during the March 2001 sampling event. The results were compared to the maximum baseline concentrations, which are compiled in Appendix A. Arsenic was detected in the groundwater sample from monitoring well MW06 at concentrations above the maximum baseline concentration. As with the detections of VOCs at this well (See Section 3.2.1.1), concentrations of arsenic during the initial baseline sampling events were lower than the following quarterly sampling events, possibly due to groundwater mounding in the former UST excavation. These concentrations may also have changed due to changes in groundwater flow due to the installation of the barrier wall. High concentrations of arsenic have generally coincided with high benzene concentrations: December 1994 (102 μ g/L), December 1997 (112 μ g/L), and March 2000 (100 μ g/L). Thus, the March 2001 detection of arsenic at MW06 (125 μ g/L) does not represent a new high concentration level. Arsenic was detected at MW48 and MW49, but at estimated concentrations below the reporting limit. There were no other detections of arsenic or lead at the other wells, and no other exceedances of baseline levels.

^{*} Indicates MW56 (replacement well)

4.0 CONCLUSIONS

The following conclusions can be drawn for each objective of the Groundwater Monitoring Plan.

Objective 1 is to collect water level data to monitor groundwater flow in the upper and lower aquifers and calculate the hydraulic gradients between the aquifers. The data collected indicates that groundwater flow directions and groundwater gradients for the March 2001 sampling event are consistent with past conditions for both the upper and lower aquifers.

Objective 2 is to collect water level data to document the performance of the PGCS and BWES and to evaluate changes in the groundwater flow system resulting from the remedial actions. The data indicate the barrier wall is containing the groundwater enclosed within the wall. In general, groundwater flow from the east is diverted toward the north/northwest and south/southwest. The groundwater diverted north/northwest is either collected in the PGCS extraction trench or continues to the wetlands. Groundwater diverted south/southwest flows along the barrier wall towards the southwest. These observations are consistent with previous observations.

Objective 3 is to collect and analyze groundwater samples from the interior of the areas of contaminated groundwater to document concentration changes with time and in response to the remedial actions. Analytical results for samples collected from North Area upper aquifer wells MW48 and MW49 indicate that concentrations of benzene and chloroethane have decreased over the past several sampling events. Samples from South Area upper aquifer well MW06 indicate that concentrations of benzene and arsenic have remained similar to historical results. In the lower aquifer, concentrations of benzene and chloroethane in MW09R have decreased over the last several sampling events. In monitoring well MW10C, benzene concentrations exceeded baseline concentrations, although concentrations decreased since the previous sampling event. Monitoring well ATMW4D was abandoned and replaced with MW56, and benzene and chloroethane concentrations from the sample from the replacement well were non-detect.

Objective 4 is to assess progress toward attaining cleanup objectives in the contaminated areas. Concentrations of benzene and chloroethane in MW48 and MW49 have decreased over the past several monitoring events, and may be related to Oxygen Release Compound (ORC) injection and the fact that the barrier wall contains the original source material. Concentrations of benzene and chloroethane in lower aquifer well MW09R have decreased over the last several sampling events.

In summary, groundwater elevation data at the ACS Site indicate that no significant changes have occurred in the groundwater flow directions at the Site since completion of the barrier wall. The groundwater monitoring data at the ACS Site demonstrate that the BWES is working to contain contaminants inside the barrier wall, that contamination outside of the barrier wall has not migrated beyond its historical extent, and that

concentrations in contaminated areas beyond the barrier wall have decreased in several areas. While some sample results show variability, most are below baseline values or show decreasing concentration trends. Sample results from the North Area show that the BWES, PGCS, and ORC are resulting in reduced concentrations in the upper aquifer.

Recent changes in concentrations in the lower aquifer at ATMW4D and MW10C warranted the abandonment of ATMW4D. A replacement well, MW56, was installed nearby, and will be monitored quarterly to detect changes in lower aquifer concentrations in this area.

CAS/cas/jmf/PJV J:\209\\0603 ACS\March 2001\202090603a27a.doc 2090603.030401

Table 1

Groundwater Level Gauging Points - March 2001 American Chemical Service NPL Site Griffith, Indiana

Upper Aquifer Wells

Well	Refe	rence P	oints	3/2	27/01	
Designation	East	North	TOIC	level	Elevation	Notes
MW6	5298	5520	655.28	22.38	632.90	
MW11	6377	7329	640.47	6.01	634.46	
MW12	6019	6352	642.74	8.18	634.56	
MW13	5050	7814	634.08	3.39	630.69	
MW14	4882	6995	638.56	8.04	630.52	
MW15	4721	5003	637.89	5.21	632.68	
MW17	5656	5677	647.10	13.84	633.26	
MW18	5836	5746	644.89	9.10	635.79	TD=12.61
MW19	5231	4943	635.78	3.45	632.33	
MW37	5395	7976	636.78	4.93	631.85	
MW38	5903	8216	636.51	4.33	632.18	
MW39	6253	7947	637.77	4.35	633.42	
MW40	6349	6831	639.46	4.62	634.84	
MW41	6242	4517	632.74	5.26	627.48	
MW42	6264	3808	632.32	5.00	627.32	
MW43	5880	3719	633.56	5.71	627.85	
MW44	5390	4303	633.04	5.86	627.18	recorded as 15.86
MW45	5830	4388	635.35	6.58	628.77	
MW46	4526	7424	633.32	2.72	630.60	
MW47	5958	5084	640.54	6.29	634.25	
MW48	5669	7814	636.36	4.38	631.98	
MW49	5551	7650	637.00	4.95	632.05	
M1S	4362	5743	639.09	5.23	633.86	Griffith Landfilll Wells
M4S	4953	6537	633.42	2.82	630.60	Griffith Landfilll Wells

Staff Gauges

Well	Refe	rence P	oints	3/27/01		
Designation	East	North	TOSG	level	Elevation	Notes
SG2	4423	6864	622.84	NM	NM	Does Not Exist - Covered by landfill
SG7	5403	6889	637.01	NM	NM	Dry - Fire Pond is being pumped dry
SG8R	5409	5252	634.70	2.3	632.40	Estimate
SG1	5023	6196	633.50	NM	NM	Does Not Exist
SG3	4180	7123	631.17	2.2	628.97	Estimate
SG5	5464	7713	633.36	3.0	630.36	Estimate
SG6	4495	8075	632.97	2.28	630.69	
SG11	5859	8245	634.62	2.95	631.67	
SG12	5596	7867	634.12	2.97	631.15	

Notes:

All depth measurements and elevations are in units of feet.

Elevation is in feet above mean sea level.

TD = total depth

TOIC = top of inner casing

TOSG = top of staff gauge

NM = not measured (reason given under "Notes" column)

Table 1
Groundwater Level Gauging Points - March 2001
American Chemical Service NPL Site
Griffith, Indiana

Lower Aquifer Wells and Piezometers

Lower Aquiter						
Well	Ref	erence l	Points	3/2	27/01	·
Designation	East	North	TOIC	Level	Elevation	Notes
MW28	5657	5696	648.77	25.23	623.54	
PZ42	5662	5696	648.44	24.90	623.54	
PZ43	5662	5702	648.69	25.16	623.53	
MW50	5269	5383	649.43	25.89	623.54	
PZ44	6170	6766	638.47	15.55	622.92	
MW7	6113	6732	641.46	18.53	622.93	
MW10C	5229	7554	637.45	NM	NM	Could not measure due to pump in well.
MW9R	4893	6990	639.05	16.25	622.80	
MW29	4886	7012	638.06	15.10	622.96	
MW34	4880	7002	638.14	15.24	622.90	
MW23	4717	7404	633.31	10.55	622.76	
MW24	4596	8033	635.22	12.99	622.23	
MW52	4996	7814	632.74	10.35	622.39	
MW53	4977	7833	632.87	10.52	622.35	
MW51	5198	7767	634.16	11.82	622.34	
MW30	5194	7774	634.25	11.93	622.32	
MW33	5189	7774	634.13	11.83	622.30	
MW54R	5590	7592	637.51	14.84	622.67	
MW55	5595	7604	636.63	14.33	622.30	
MW8	5934	7506	640.43	17.88	622.55	
MW31	5907	7505	641.64	19.02	622.62	
MW32	5902	7507	641.84	19.30	622.54	
M4D	4949	6538	633.32	10.35	622.97	
ATMW4D	5297	7311	637.99	15.33	622.66	

Notes:

All depth measurements and elevations are in units of feet.

Elevation is in feet above mean sea level.

TOIC = top of inner casing

Table 1

Groundwater Level Gauging Points - March 2001 American Chemical Service NPL Site Griffith, Indiana

Piezometers

Well	Refe	rence P	oints	3/2	27/01	
Designation	East	North	TOC	level	Elevation	Notes
LW1	4807	5070	644.57	11.08	633.49	
LW2	4662	5465	649.70	16.86	632.84	
P3	5453	6470	639.87	4.96	634.91	
P5	5285	6510	636.70	7.98	628.72	
P7	5950	6630	643.63	8.92	634.71	
P8	6156	6734	639.27	4.46	634.81	
P9	6134	6994	638.88	4.20	634.68	
P10	5413	5852	649.32	14.15	635.17	Strong odor
P11	5199	5900	649.14	NM	NM	Dry. TD=14.00
P13	4878	5735	651.20	18.01	633.19	
P15	5003	6187	639.93	7.29	632.64	
P16	4673	5749	648.80	15.22	633.58	
P17	4584	6006	654.64 634.30	21.20	633.44	
P22	4636	6732	634.30	5.29	629.01	
P23	4689	7018	636.18	5.81	630.37	
P24	5002	7178	636.06	5.12	630.94	
P25	5131	7510	635.01	4.33	630.68	
P26	4764	7309	634.23	3.78	630.45	
P27	4904	7020	639.70	8.69	631.01	
P28	5883	7486	644.53	10.61	633.92	
P29	5738	6619	642.37	6.52	635.85	
P31	5480	7159	641.03	4.46	636.57	
P32 P36	5746 5410	7026 6851	642.32 645.89	6.73 11.58	635.59 634.31	
P39	5940	6902	642.00	6.24	635.76	<u> </u>
P40	5931	7241	638.77	4.36	634.41	
P41	5663	7377	637.23	3.40	633.83	
P49	5145	6949	638 98	5.46	633.52	
P51	3876	6859	638.98 635.07	NM	NM	Could not access due to high creek levels
P52	4100	7845	636.66	6.08	630.58	Could not access due to high creek levels
P53	4597	8015	636.18	5.52	630.66	
P54	4936	8081	638.28	6.70	631.58	
P55	5628	7979	636.08	4.87	631.21	
P56	6405	7665	639.46	5.14	634.32	
P59	6389	6590	639.22	4.23	634.99	· · · · · · · · · · · · · · · · · · ·
P60	6111	6051	640.23	5.53	634.70	
P61	5533	5284	638.58	NM	NM	Destroyed
P62	5665	4945	637.06	NM	NM	Destroyed
P63	5483	7689	637.70	6.31	631.39	
P64	4617	7065	634.87	4.53	630.34	
P65	4615	7063	634.77	4.35	630.42	
P66	4729	7034	636.02	5.66	630.36	
P67	4732	7034	636.06	5.61	630.45	
P68	4743	7752	634.48	3.59	630.89	
P69	4741	7751	634.66	3.71	630.95	
P70	4880	7680	635.38	4.82	630.56	
P71	4876	7682	635.32	4.55	630.77	

Notes

All depth measurements and elevations are in units of feet.

Elevation is in feet above mean sea level.

TOC = top of casing

NM = not measured (reason given under "Notes" column)

Piezometers P4, P6, P12, P18, P30, P35, P37, P38, P50, and EW1 are destroyed

Table 1

Groundwater Level Gauging Points - March 2001 American Chemical Service NPL Site Griffith, Indiana

New Piezometers - Upper Aquifer

Well	Refe	rence P	oints	3./.	27/01	
Designation	East	North	TOC	level	Elevation	Notes
GCS Piezometer	r Sets					
P81	5577	7581	636.19	4.34	631.85	
P82	5577	7572	635.77	3.74	632.03	,
P83	5577	7562	635.95	3.99	631.96	
P84	5322	7603	634.35	3.47	630.88	
P85	5326	7594	634.08	3.30	630.78	
P86	5329	7585	634.41	3.38	631.03	
P87.	5121	7466	633.88	3.27	630.61	
P88	5130	7460	633.90	3.21	630.69	
P89	5137	7454	634.02	3.33	630.69	
P90	4881	7152	632.59	2.41	630.18	
P91	4889	7145	632.97	4.13	628.84	
P92	4896	7138	633.63	3.35	630.28	
WES Piezomete						<u> </u>
P93	5136	7067	638.79	NM	NM	Could not find. Possibly covered by gravel
P94	5146	7061	638.98	NM	NM	Destroyed
P95	5146	6532	638.58	6.31	632.27	
P96	5156	6537	638.39	11.34	627.05	
P97	5098	6283	638.39	5.95	632.44	
P98	5130	6279	639.35	4.12	635.23	
P99	5020	5945	644.35	10.60	633.75	
P100	5031	5948	643.93	8.45	635.48	
P101	5550	5979	650.08	16.22	633.86	
P102	5517	5996	647.18	11.40	635.78	
P103	5672	6248	644.97	11.08	633.89	
P104	5639	6267	646.68	11.22	635.46	
P105	5885	6678	638.86	4.01	634.85	
P106	5871	6685	638.10	2.62	635.48	
P107	5766	7339	637.42	3.72	633.70	
P108	5757	7324	638.13	2.89	635.24	
RC Piezometer	s					
ORC PZ1	5685		638.57	6.08	632.49	
ORC PZ2	5758	7457	643.43	9.81	633.62	
ORC PZ3	5760	7540	640.24	6.95	633.29	
ORC PZ4	5827	7502	643.79	10.05	633.74	
ORC PZ5	5741	7753	636.21	3.85	632.36	
ORC PZ6	5759	7792	636.13	3.68	632.45	
ORC PZ7	5792	7839	635.85	3.42	632.43	
ORC PZ8	5813	7763	638.16	5.53	632.63	

Notes:

All depth measurements and elevations are in units of feet.

Elevation is in feet above mean sea level.

TD = total depth

TOC = top of casing

NM = not measured (reason given under "Notes" column)

Table 2
Summary of Field Parameter Results - March 2001
American Chemical Service NPL Site
Griffith, Indiana

		Field Parameters										
Well ID	pH (std. units)	Conductivity (S/m)	Temperature (°C)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)						
MW06	7.52	0.313	14.6	160	0.60	361						
MW09R	7.78	0.079	11.9	240	1.1	283						
MW10C	8.37	0.163	10.2	1	6.3*	423						
MW48	7.62	0.077	7.8	45	0.6	290						
MW49	7.51	0.054	6.9	28	1.4	307						
ATMW4D	8.30	0.089	14.4	29	0.6	259						
MW56	7.54	0.100	15.3	230	1.8	-26						

Notes

MW56 was sampled on April 19, 2001

NTU = nephelometric turbidity units

S/m = Siemers per meter

mg/l = milligrams per liter

mV = millivolts

^{*} Dissolved oxygen reading high due to contact with atmosphere.

Table 3 Upper Aquifer Wells Sampled - March 2001 American Chemical Service NPL Site Griffith, Indiana

	Area of Groundwater Contamination	Well Identification	Location with Respect to Area of Groundwater Contamination	Monitoring Parameters March 2001
1	North	MW48	Internal	IND
2	North	MW49	Internal	IND
3	South	MW06	Internal	IND

Note:

IND: Arsenic, lead, VC, benzene, chloroethane, TCE, PCE, TCA, DCE, and 1,2-DCA.

Table 4 Lower Aquifer Wells Sampled - March 2001 American Chemical Service NPL Site Griffith, Indiana

	Well Identification	Well Screen Depth in Lower Aquifer	Location with Respect to Area of GW Contamination	Monitoring Parameters March 2001
1	MW10C	Upper	Internal	IND - VOCs only
2	MW9R	Upper	Internal	IND
3	ATMW-4D	Upper	Internal	IND - VOCs only
4	MW56	Upper	Internal	IND - VOCs only

Notes:

IND: Arsenic, lead, VC, benzene, chloroethane, TCE, PCE, TCA, DCE, and 1,2-DCA. MW56 was sampled on April 19, 2001.

Table 5
Vertical Gradients in Lower Aquifer - March 2001
American Chemical Service NPL Site
Griffith, Indiana

Well	Screen	Interval	Separation	Lowest	C	Groundwate	er Elevatio	n	, T	Vertical Gra	dients
ł				Measurable					Upper/	Middle/	
Nest	Top	Bottom	(feet)	Gradient	Upper	Middle	Lower	delta	Middle	Lower	Upper/ Lower
MW7	595.9	590.9			622.93						
PZ44	578.4	573.4	13	0.0008		622.92		-0.01	WU	NA	NA
MW8	598.2	593.2			622.55						
MW31	574.6	564.6	19	0.0005		622.62		0.07	0.0038		
MW32	547.3	537.3	17	0.0006			622.54	-0.08		-0.0046	wu _
MW9R	605.9	600.9			622.80						
MW29	585.9	575.9	15	0.0007		622.96		0.16	0.0107		
MW34	552.8	542.8	23	0.0004			622.90	-0.06		-0.0026	0.0021
MW30	585.0	575.0	13	0.0008	-	622.32			NA		
MW33	556.0	546.0	19	0.0005			622.30	-0.02		-0.0011	NA
MW28	588.7	578.7			623.54				•		
PZ42	568.5	563.5	10	0.0010		623.54		0	WU	•	
PZ43	554.5	549.5	9	0.0011			623.53	-0.01		WU	WU
MW52	615.6	605.6			622.39						
MW53	555.7	545.7	50	0.0002			622.35	-0.04	NA_	NA	-0.0008
MW54R	608.1	598.1			622.67						
MW55	547.6	537.6	51	0.0002			622.30	-0,37	NA	NA	-0.0073

Notes:

Water level measurements collected on September 18, 2000.

Elevation is in feet above mean sea level.

NA = Not Applicable. Calculating vertical gradient only for upper/lower interval at this location.

WU = Within uncertainty of measurement technique.

- (-) = Downward Gradient
- (+) = Upward Gradient

See September 1997 Groundwater Sampling Results Report and Groundwater Monitoring Plan (July 1998), p. 4, for an explanation of calculation method.

Table 6
Vertical Gradients Between Upper and Lower Aquifers - March 2001
American Chemical Service NPL Site
Griffith, Indiana

Well	Screen Interval		Screen	Screen Separation		Groundwater Elevation			
Designation	Тор	Bottom	Midpoint	(feet)	Upper	Lower	delta	Gradient_	
P28	634.30	629.30	631.80	11.0	633.92				
MW8	598.20	593.20	595.70			622.55	-11.4	-1.03	
P27	631.02	626.02	628.52	22.6	631.01				
MW9R	605.90	600.90	603.40			622.80	-8.2	-0.36	
P8	635.36	630.36	632.86	18.0	634.81		}		
MW7	595.90	590.90	593.40			622.93	-11.9	-0.66	

Notes:

Water level measurements collected on September 18, 2000.

Elevation is in feet above mean sea level.

- (-) = Downward Gradient
- (+) = Upward Gradient

See September 1997 Groundwater Sampling Results Report and Groundwater Monitoring Plan (July 1998),

p. 4, for an explanation of calculation method.

Table 7

Summary of Organic Compound Detections in the Upper Aquifer Validated Results - March 2001 American Chemical Service NPL Site

Griffith, Indiana

	N	MW-06		MW-48			MW-49	
Parameter (VOCs - ug/L)	Mar-01		BV	Mar-01		BV	Mar-01	BV
Benzene	2,000	D/	320	2,000	D/	9,500	900	6,750
Chloroethane	270	D/	720	78	J/	1,000	120	715

Notes:

ug/L = micrograms per liter

BV = Baseline Value

J/_ = Data qualifier added by laboratory

_/J = Data qualifier added by data validator

D = Results based on diluted sample

J = Estimated value

A blank cell indicates the parameter was not detected.

Bold result indicates an exceedance of BV

Table 8 Summary of Organic Compound Detections in the Lower Aquifer Validated Results - March 2001 American Chemical Service NPL Site Griffith, Indiana

	AT	ATMW4D		MW-09R			MW-10C			MW56	
Parameter (VOCs - ug/L)	Mar-	Mar-01 BV		Mar-01		BV	Mar-01		BV	Apr-01	BV
Benzene	1,800		NS	41		310	410	D/	150		NS
Chloroethane	42	J/	NS	360	D/	2,900	190	-	420	-	NS

Notes:

ug/L = micrograms per liter.

BV = Baseline Value

NS = Not sampled

J/_ = Data qualifier added by laboratory

_/J = Data qualifier added by data validator

D = Results based on diluted sample

J = Estimated value

A blank cell indicates parameter not detected.

Bold result indicates an exceedance of BV

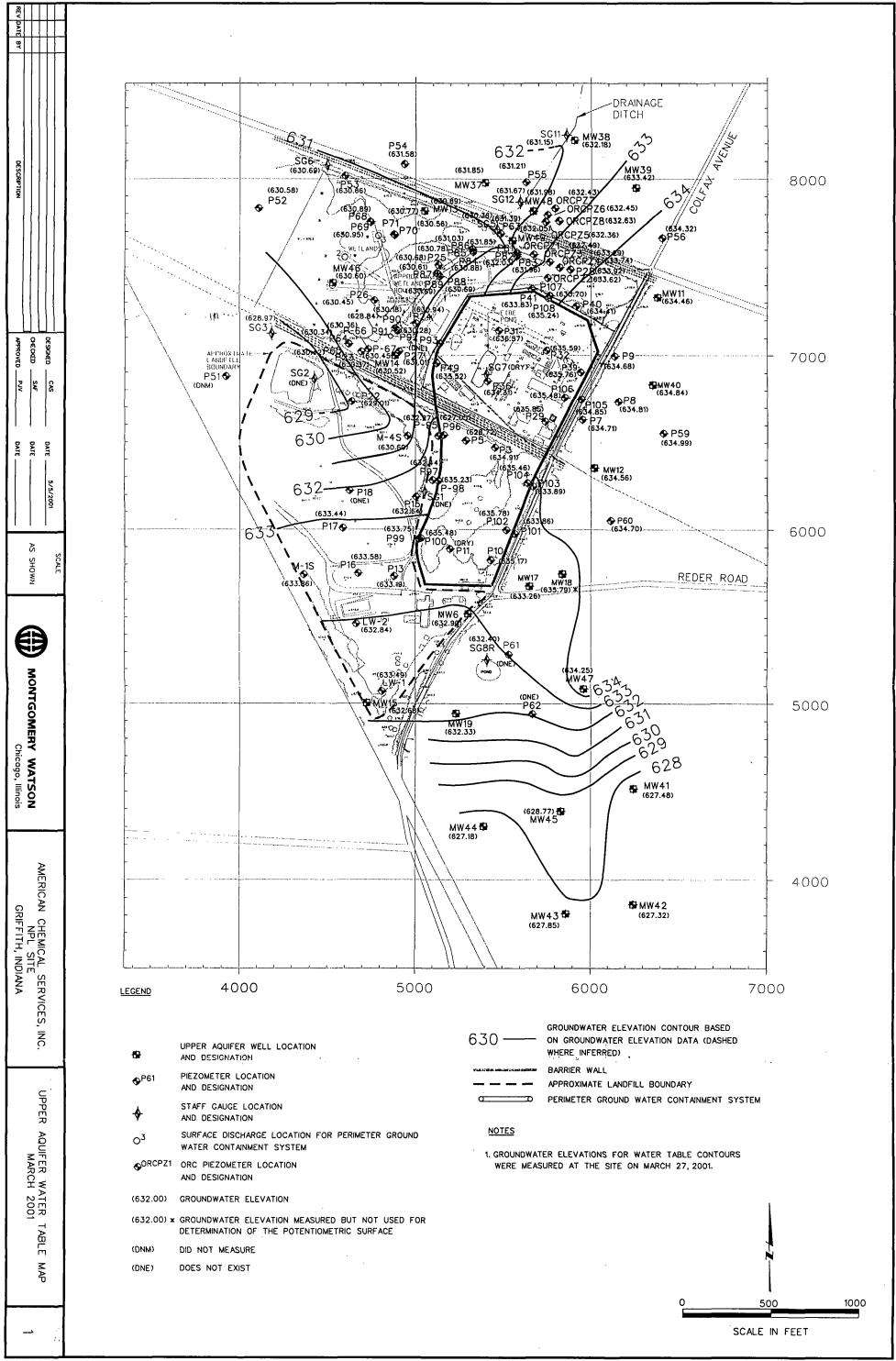
Table 9

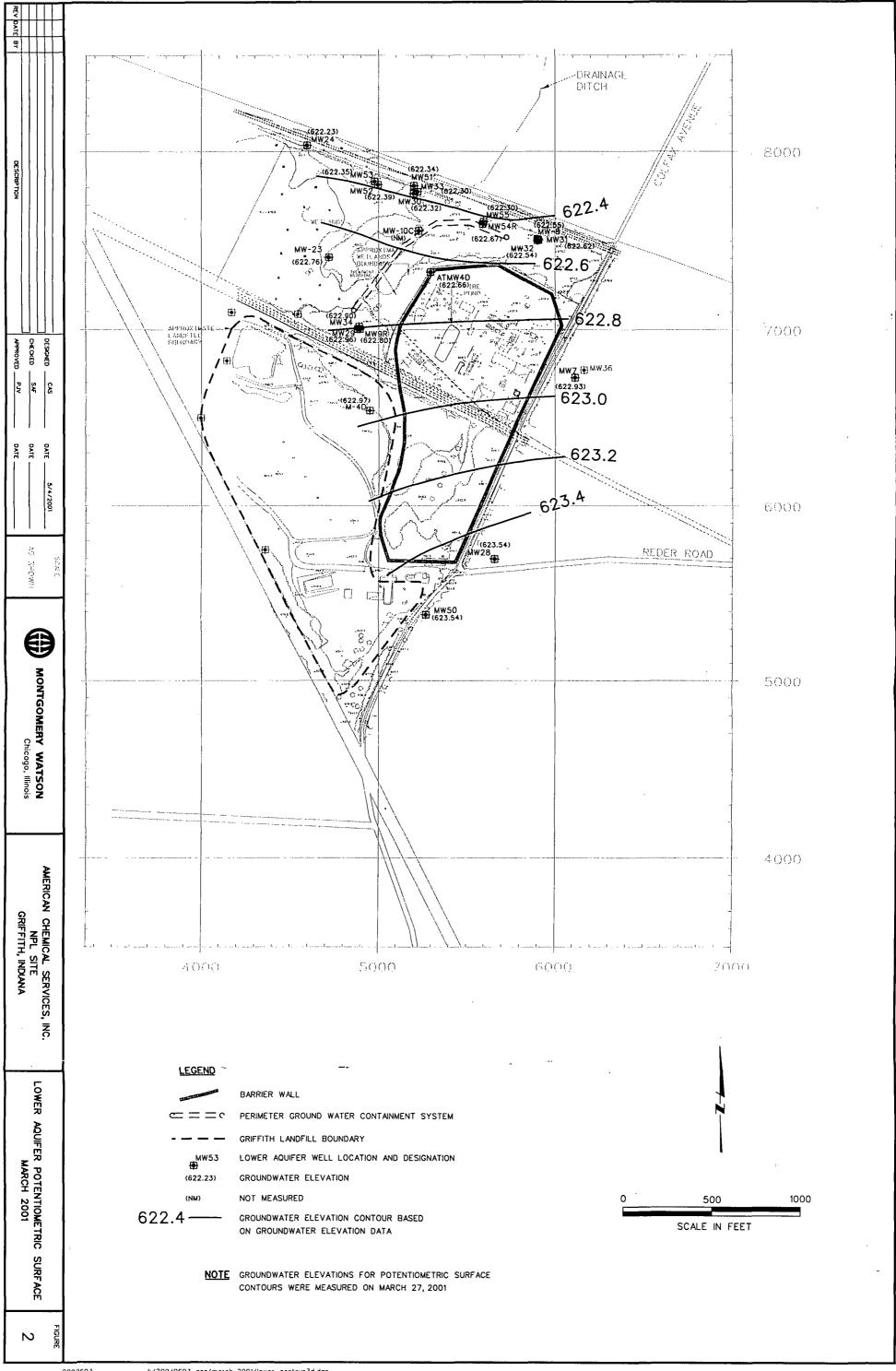
Summary of Inorganic Baseline Exceedances - March 2001 American Chemical Service NPL Site Griffith, Indiana

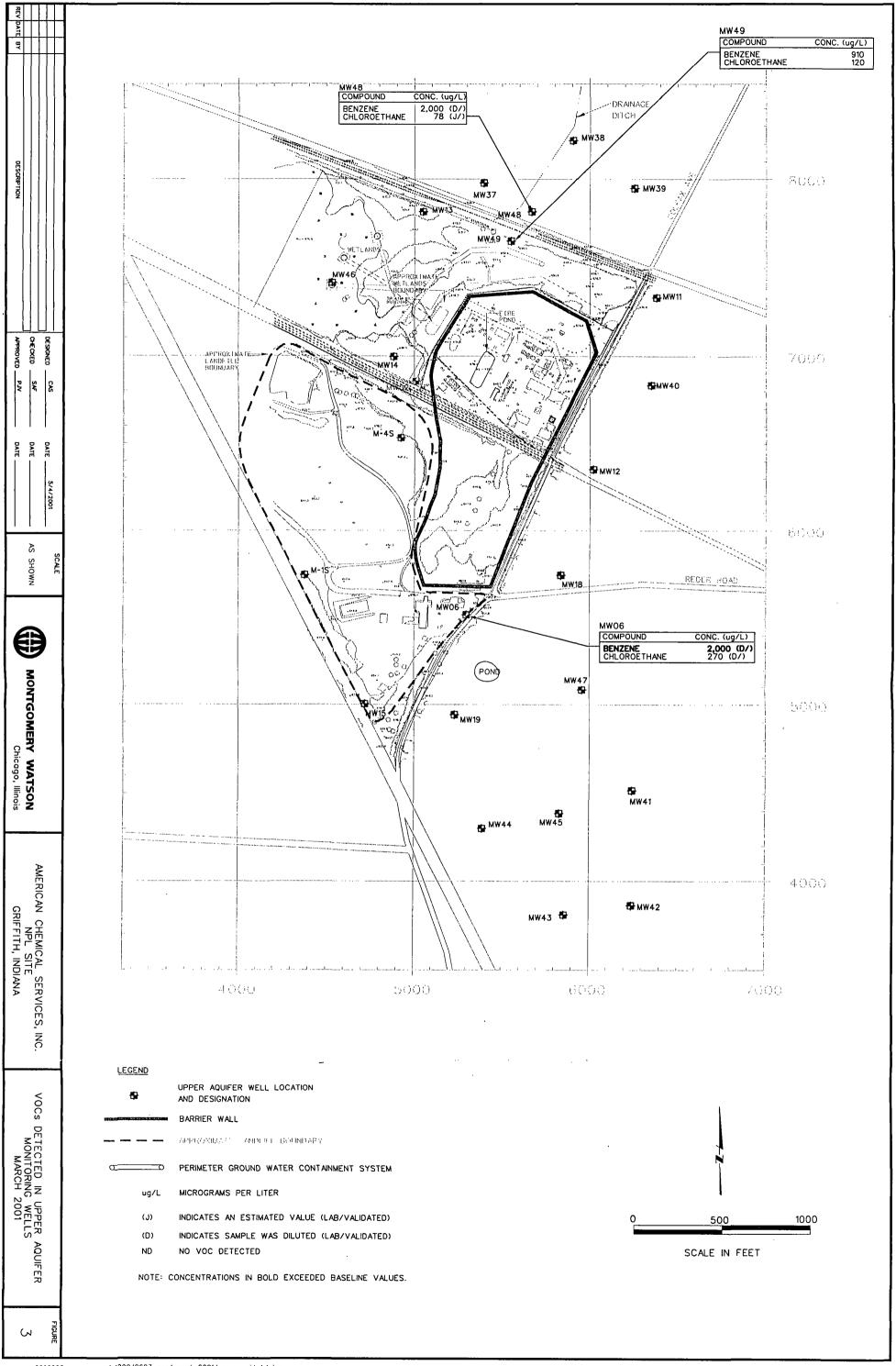
	Potentially Significant	Potentially Significant	Arsenic		Lead	Total Number of	
Well	Sep-00	Mar-01	Mar-01	Baseline	Mar-01 Baseline	EXCEEDANCES	
UPPER AQUIF							
MW-06		R	125	72		1	
MW-48						0	
MW-49						0	
LOWER AQUI							
MW-09R		T				0	
		Number of Exceedances	l i		0	1	

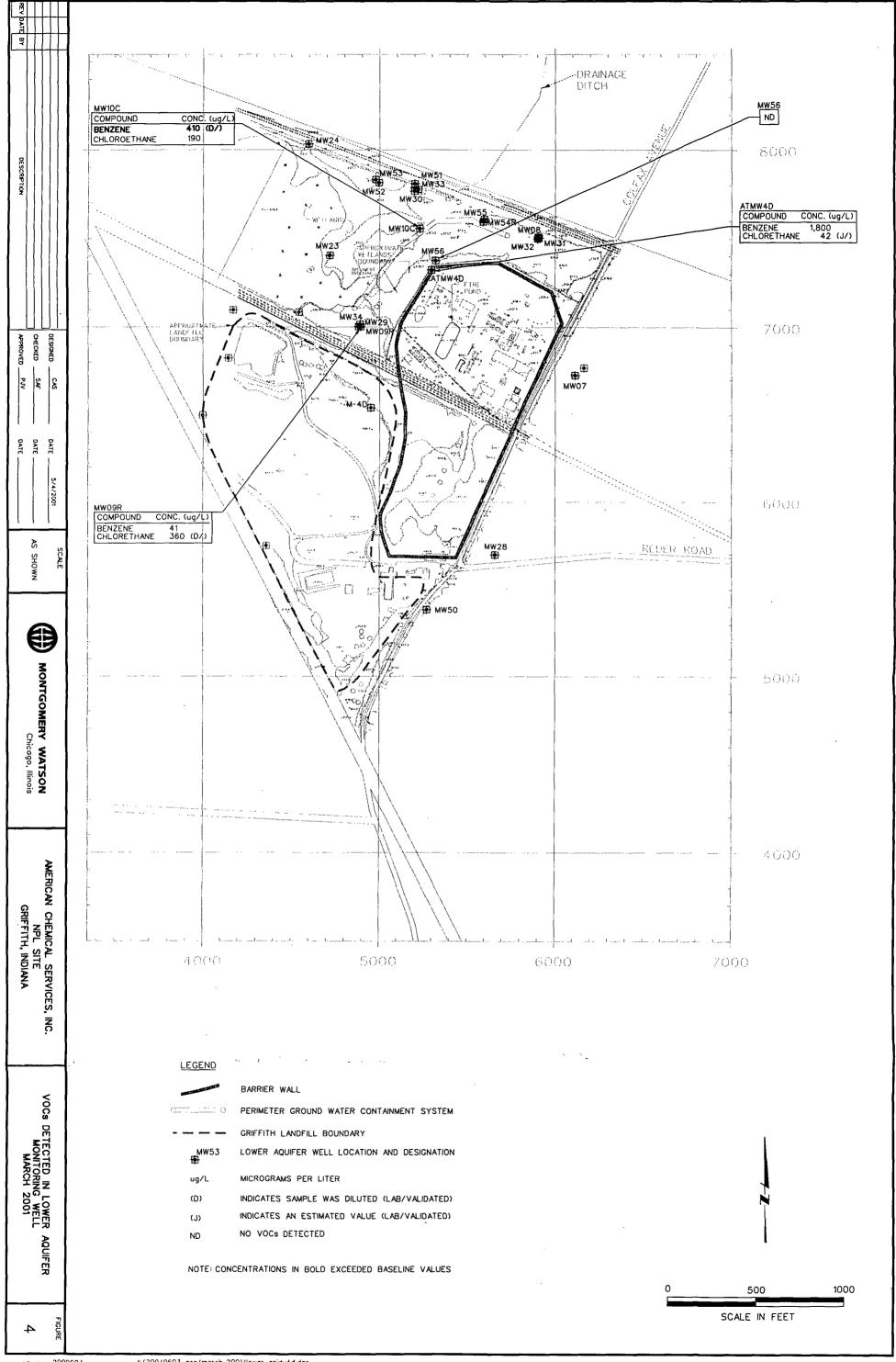
Notes:

- 1. No results for inorganic species in the March 2001 sampling results exceeded the maximum baseline concentration for that species by a factor of 2x or more.
- 2. Blank cells indicate that for the March 2001 sampling round, the inorganic species did not exceed the baseline maximum.
- 3. The four monitoring wells listed above were analyzed for Arsenic and Lead during March 2001.
- 4. R = Recurrence: Sample results are potentially significant due to recurrence of exceedance.
- 5. F = Frequency: Sample results are potentially significant due to the frequency of exceedance (>25% or 7 individual analytes).
- 6. M = Magnitude: Sample results are potentially significant due to magnitude of exceedance (>2x maxium baseline)









APPENDIX A

COMPARISON OF MARCH 2001 RESULTS TO BASELINE MAXIMUM CONCENTRATIONS

Comparison of Results to Baseline Highest Detections

March 2001

American Chemical Services NPL Site Griffith, Indiana

Well	Analyte	Units	Highest Detect	Current Event			
			during Baseline	Result	LQ	DQ	Detect Limit
ATMW-4D	1,1,1-Trichloroethane	UG/L			U		100
ATMW-4D	1,1,2-Trichloroethane	UG/L			U		100
ATMW-4D	1,1-Dichloroethene	UG/L			U		100
ATMW-4D	Benzene	UG/L		1,800			100
ATMW-4D	Chloroethane	UG/L		42	J		100
ATMW-4D	cis-1,2-Dichloroethene	UG/L			U		100
ATMW-4D	Tetrachloroethene	UG/L			U		100
ATMW-4D	trans-1,2-Dichloroethene	UG/L			U		100
ATMW-4D	Trichloroethene	UG/L			Ū	<u> </u>	100
ATMW-4D	Vinyl chloride	UG/L			U		100
MW-06	1,1,1-Trichloroethane	UG/L	50		U		_10
MW-06	1,1,2-Trichloroethane	UG/L	50		U		_10
MW-06	1.1-Dichloroethene	UG/L	50		. U		. 10
MW-06	Benzene	UG/L	320	2.000	. D		100
MW-06	Chloroethane	UG/L	720	270	D		100
MW-06	cis-1,2-Dichloroethene	UG/L			U		10
MW-06	Tetrachloroethene	UG/L	50		U		10
MW-06	trans-1,2-Dichloroethene	UG/L			U		10
MW-06	Trichloroethene	UG/L	50		U		_10
MW-06	Vinyl chloride	UG/L	50		U		10
	1,1,1-Trichloroethane	UG/L	200		U		10
	1,1,2-Trichloroethane	UG/L	200		U	ļ <u>.</u>	_10
	1,1-Dichloroethene	UG/L	200		U	<u> </u>	_10
	Benzene	UG/L	310	41			10
	Chloroethane	UG/L	2,900	360	D		_33
	cis-1,2-Dichloroethene	UG/L			U		10
	Tetrachloroethene	UG/L	200		U	<u> </u>	10
	trans-1,2-Dichloroethene	UG/L			U		10
	Trichloroethene	UG/L	200		U	ļ. <u>.</u>	10
	Vinyl chloride	UG/L	200		U	<u> </u>	10
	1,1,1-Trichloroethane	UG/L	150		U		10
	1,1,2-Trichloroethane	UG/L	150		U	<u> </u>	_10
	1,1-Dichloroethene	UG/L	150	011/-	U	<u> </u>	10
	Benzene	UG/L	150	410	D		33
	Chloroethane	UG/L	420	_190		ļ. <u></u>	_10
	cis-1,2-Dichloroethene	UG/L			U		_10
	Tetrachloroethene	UG/L	150		U	1	10
	trans-1,2-Dichloroethene	UG/L			U	↓	10
MW-10C	Trichloroethene	UG/L	150		U	<u> </u>	10
MW-10C	Vinyl chloride	UG/L	129		U		10
MW-48	1,1,1-Trichloroethane	UG/L	500		U		100
MW-48	1,1,2-Trichloroethane	UG/L	500		U		100
MW-48	1,1-Dichloroethene	UG/L	500		U	<u> </u>	100
MW-48	Benzene	UG/L	9,500	2,000	D	<u> </u>	170
MW-48	Chloroethane	UG/L	1,000	78	J		100
MW-48	cis-1,2-Dichloroethene	UG/L	l	<u> </u>	U	<u> </u>	_100

BOLD = Exceedance

NA = Not Applicable

Comparison of Results to Baseline Highest Detections March 2001

American Chemical Services NPL Site Griffith, Indiana

Well	Analyte	Units	Highest Detect	Current Event			
	<u> </u>		during Baseline	Result	LQ	DQ	Detect Limit
MW-48	Tetrachloroethene	UG/L	500		U		100
MW-48	trans-1,2-Dichloroethene	UG/L			U		100_
MW-48	Trichloroethene	UG/L	500		U		100
MW-48	Vinyl chloride	UG/L	500		Ū		100
MW-49	1,1,1-Trichloroethane	UG/L	500		U		50
MW-49	1,1,2-Trichloroethane	UG/L	500		U		50
MW-49	1,1-Dichloroethene	UG/L	500		U		50
MW-49	Benzene	UG/L	6,750	900			50
MW-49	Chloroethane	UG/L	715	120			50
MW-49	cis-1,2-Dichloroethene	UG/L			Ü		50
MW-49	Tetrachloroethene	UG/L	500		Ü		50
MW-49	trans-1,2-Dichloroethene	UG/L			U		50
MW-49	Trichloroethene	UG/L	500		U		50
MW-49	Vinyl chloride	UG/L	500		Ū		50
MW-56	1,1,1-Trichloroethane	UG/L		·	U		10
MW-56	1,1,2-Trichloroethane	UG/L			U		10
MW-56	1,1-Dichloroethene	UG/L			U		10
MW-56	Benzene	UG/L			U		10
MW-56	Chloroethane	UG/L			U		10
MW-56	cis-1,2-Dichloroethene	UG/L			U		10
MW-56	Tetrachloroethene	UG/L			U		10
MW-56	trans-1,2-Dichloroethene	UG/L			Ü		10
MW-56	Trichloroethene	UG/L			U		10
MW-56	Vinyl chloride	UG/L			U		10

Comparison of Results to Baseline Highest Detections March 2001

American Chemical Services NPL Site Griffith, Indiana

Well	Analyte	Units	Highest Detect	Carrentsie		Event	
			during Baseline	Result	LQ	DQ	Detect Limit
MW-06	Arsenic	UG/L	72	125			10
MW-06	Lead	UG/L	9.6		U		1.7
MW-09R	Arsenic	UG/L	6.8		U		4.2
MW-09R	Lead	UG/L	6.7		U		1.7
MW-48	Arsenic	UG/L	13	6.8	В		10
MW-48	Lead	UG/L	7.7		U		1.7
MW-49	Arsenic	UG/L	38	7.8	В		10
MW-49	Lead	UG/L	4.4		U	·	1.7

APPENDIX B

TIME TREND PLOTS

Upper Aquifer Monitoring Well: MW6

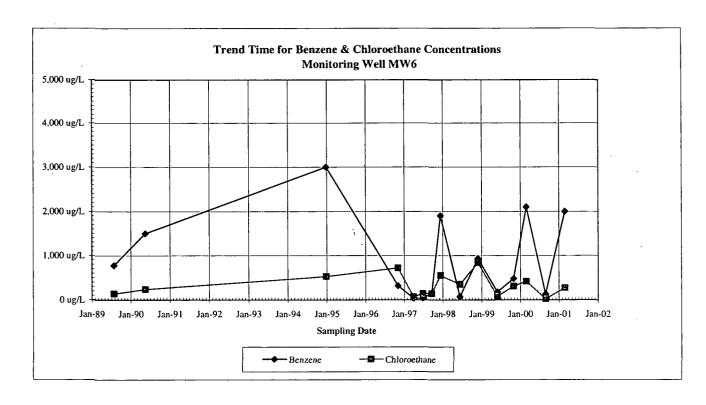
Baseline Groundwater Monitoring

ACS NPL Site

MW6

<u>Date</u>	Benzene	Chloroethane
BASELINE	320	720
August-89	780 ug/L	140 ug/L
May-90	1,500 ug/L	240 ug/L
December-94	3,000 ug/L	530 ug/L
November-96	320 ug/L	720 ug/L
April-97	35 ug/L	67 ug/L
July-97	39 ug/L	140 ug/L
September-97	140 ug/L	140 ug/L
December-97	1,900 ug/L	550 ug/L
June-98	72 ug/L	350 ug/L
December-98	930 ug/L	840 ug/L
June-99	180 ug/L	78 ug/L
November-99	480 ug/L	310 ug/L
March-00	2,100 ug/L	420 ug/L
September-00	130 ug/L	22 ug/L
March-01	2,000 ug/L	270 ug/L

BDL = Below the Detection Limit

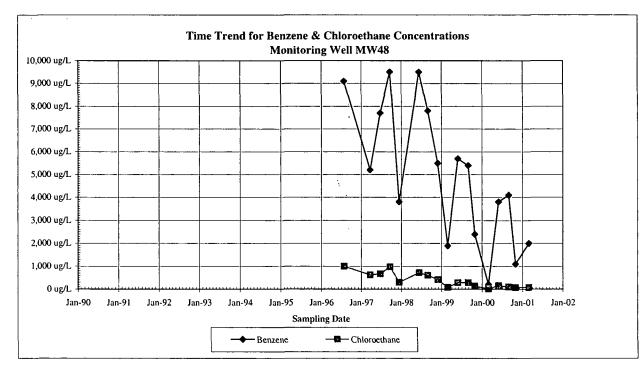


Baseline Groundwater Monitoring

ACS NPL Site

MW48

Date	Benzene	Chloroethane
Baseline	9500	1000
August-89		
May-90		
December-94		
August-96	9,100 ug/L	1,000 ug/L
March-97	5,200 ug/L	620 ug/L
June-97	7,700 ug/L	670 ug/L
September-97	9,500 ug/L	980 ug/L
December-97	3,800 ug/L	300 ug/L
June-98	9,500 ug/L	720 ug/L
September-98	7,800 ug/L	610 ug/L
December-98	5,500 ug/L	420 ug/L
March-99	1,900 ug/L	83 ug/L
June-99	5,700 ug/L	290 ug/L
September-99	5,400 ug/L	290 ug/L
November-99	2,400 ug/L	140 ug/L
March-00	220 ug/L	24 ug/L
June-00	3,800 ug/L	160 ug/L
September-00	4,100 ug/L	100 ug/L
November-00	1,100 ug/L	78 ug/L
March-01	2,000 ug/L	78 ug/L

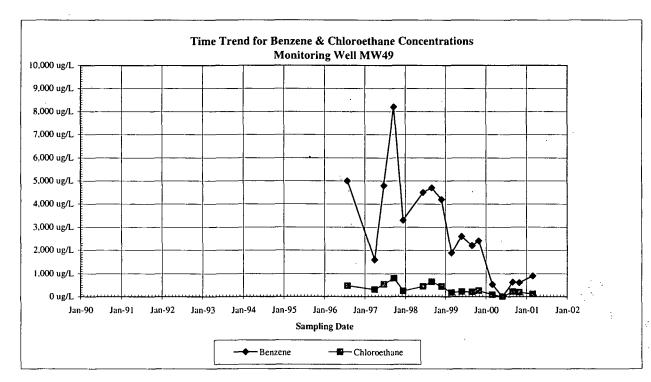


Baseline Groundwater Monitoring

ACS NPL Site

MW49

Date	Benzene	Chloroethane
Baseline	6750	715
August-89		
May-90		
December-94		
August-96	5,000 ug/L	480 ug/L
April-97	1,600 ug/L	310 ug/L
June-97	4,800 ug/L	540 ug/L
September-97	8,200 ug/L	810 ug/L
December-97	3,300 ug/L	250 ug/L
June-98	4,500 ug/L	450 ug/L
September-98	4,700 ug/L	650 ug/L
December-98	4,200 ug/L	440 ug/L
March-99	1,900 ug/L	180 ug/L
June-99	2,600 ug/L	220 ug/L
September-99	2,200 ug/L	210 ug/L
November-99	2,400 ug/L	260 ug/L
March-00	530 ug/L	91 ug/L
June-00	ND	ND
September-00	630 ug/L	220 ug/L
November-00	610 ug/L	190 ug/L
March-01	900 ug/L	120 ug/L



Lower Aquifer Monitoring Well: MW9/MW9R

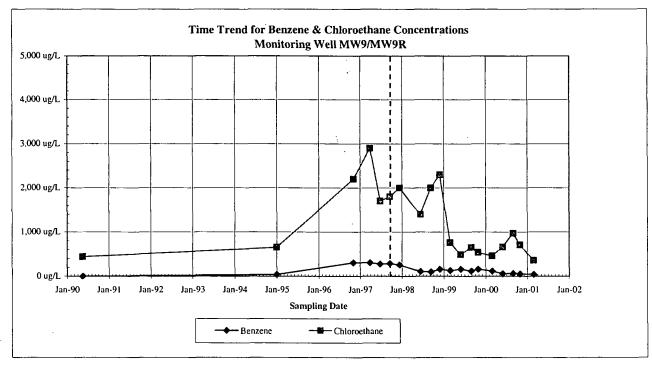
Baseline Groundwater Monitoring

ACS NPL Site

MW9/MW9R

Date	Benzene	Chloroethane	1
BASELINE	310	2900	1
August-89]
May-90	BDL	440 ug/L]
January-95	40 ug/L	650 ug/L	
November-96	310 ug/L	2,200 ug/L]
April-97	310 ug/L	2,900 ug/L]
June-97	280 ug/L	1,700 ug/L	
September-97	290 ug/L	1,800 ug/L	
December-97	260 ug/L	2,000 ug/L	MW09
June-98	110 ug/L	1,400 ug/L	MW09R
September-98	100 ug/L	2,000 ug/L]
December-98	160 ug/L	2,300 ug/L	
March-99	130 ug/L	760 ug/L	
June-99	160 ug/L	490 ug/L]
September-99	120 ug/L	650 ug/L	
November-99	160 ug/L	540 ug/L	
March-00	120 ug/L	460 ug/L	1
June-00	60 ug/L	660 ug/L	
September-00	65 ug/L	970 ug/L	
November-00	55 ug/L	710 ug/L	
March-01	41 ug/L	360 ug/L	

BDL = Below the Detection Limit



Line indicates change to replacement well

Lower Aquifer Monitoring Well: MW10C

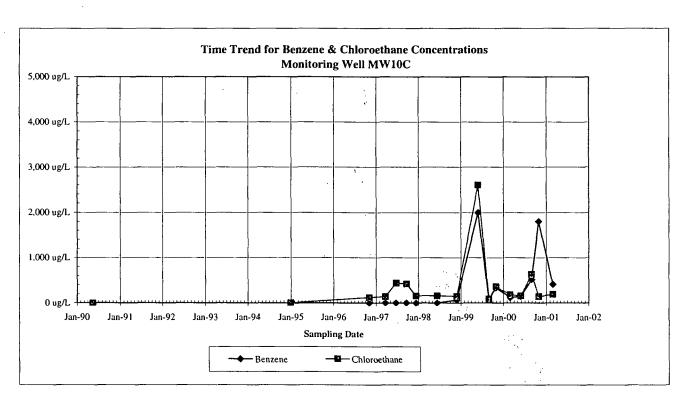
Baseline Groundwater Monitoring

ACS NPL Site

MW10C

<u>Date</u>	Benzene	Chloroethane
BASELINE	150	420
August-89		
May-90	BDL	BDL
January-95	BDL	BDL
November-96	BDL	120 ug/L
March-97	BDL	140 ug/L
June-97	BDL	440 ug/L
September-97	BDL	420 ug/L
December-97	BDL	160 ug/L
June-98	BDL	160 ug/L
December-98	66 ug/L	150 ug/L
June-99	2,000 ug/L	2,600 ug/L
September-99	83 ug/L	88 ug/L
November-99	340 ug/L	360 ug/L
March-00	120 ug/L	180 ug/L
June-00	150 ug/L	160 ug/L
September-00	520 ug/L	630 ug/L
November-00	1,800 ug/L	140 ug/L
March-01	410 ug/L	190 ug/L

BDL = Below the Detection Limit

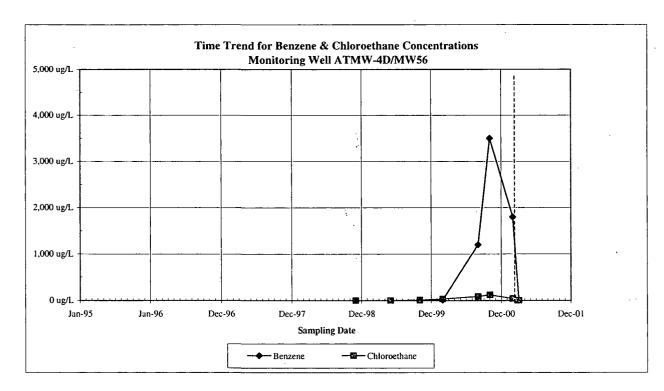


Baseline Groundwater Monitoring

ACS NPL Site

ATMW-4D/MW56

<u>Date</u>	Benzene	Chloroethane	7
Baseline	- 1	-	
December-98	ND	ND .	1
June-99	ND	ND	1
November-99	3 ug/L	9 ug/L	1
March-00	12 ug/L	34 ug/L	
September-00	1,200 ug/L	88 ug/L	
November-00	3,500 ug/L	120 ug/L]
March-01	1,800 ug/L	42 ug/L	ATMW4D
April-01	ND	ND	MW56
			1 .
			1
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			1
			1
			1
			1
			1



APPENDIX C

VALIDATION NARRATIVE AND LABORATORY REPORTS

FROM UPPER AQUIFER

MEMORANDUM



To:

Chad Smith

Date: April 25, 2001

From:

Matthew Reeder, MW-SLC

Subject:

Data Validation for American

Job No.: 2090603

Chemical Service (ACS).

SDG: E1201

Griffith, Indiana.

INTRODUCTION

The following text is based on the validation of water samples collected at American Chemical Service, Inc. in March 2001.

Seven water samples and three QA/QC samples were analyzed by CompuChem Laboratories, Cary, North Carolina for the following parameters:

- SDG E1201 VOA, CLP-OLM 3.1, (samples: GWATMW4D-16, GWMW06-16, GWMW10C-16, GWMW48-16, GWMW49-16, GWMW9R-16, GWW1-16, GWMW48-96, GWFB01-16, GWTB01-16)
- SDG E1201 Arsenic and Lead, CLP-ILM 4.1, (samples: GWMW06-16, GWMW48-16, GWMW49-16, GWMW9R-16, GWMW48-96, GWFB01-16)

Data validation was conducted in accordance with procedures specified in Pre-Design Activities Quality Assurance Project Plan (MW, 1995), USEPA Contract Laboratory Program Statement of Work for Organic Analysis OLM03.1(U.S. EPA August 1994), USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis Multi-Media Multi-Concentration ILM04.1 (U.S. EPA February 2000); and was also based on principles outlined in National Functional Guidelines for Organic Data Review (USEPA, 1994a), and National Functional Guidelines for Inorganic Data Review (USEPA, 1994b).

The following field quality control samples were collected during the March 2001 sampling round:

- One field blank (GWFB01-16)
- One field duplicate (GWMW48-96)
- One trip blank (GWTB01-16)

This memorandum contains a narrative summarizing the data quality objectives specified in the work plan.

SUMMARY

This section describes the quality control parameters reviewed during validation, summarizes the data quality objectives as a result of the validation and provides a summary of the deficiencies and qualification applied. The following paragraphs describe deficiencies that were identified which resulted in qualification of the sample results. Each analysis is separated into sections for clarity.

Volatile Organic Compounds

Major Deficiencies: There were no major deficiencies identified during the validation process.

<u>Minor Deficiencies</u>: Benzene was detected below the reporting limit in the trip blank. Trichloroethene was detected below the reporting limit in the method blanks.

Metals (As and Pb)

Major Deficiencies: There were no major deficiencies identified during the validation process.

Minor Deficiencies: There were no minor deficiencies identified during the validation process.

DATA QUALITY OBJECTIVES

The following is a summary of the data quality objectives that were evaluated during the data validation process.

Reporting Limits: Reporting limits were met for all analyses with the following exception.

- For VOCs: Reporting limits were met with the exception of necessary dilutions. Both the original and diluted sample results were included.
- For Metals: Reporting limits were met without exception.

Accuracy

<u>Laboratory Control Sample:</u> Validation of the LCS was performed for inorganic analyses. The LCS for the inorganic analyses were within control limits and analyzed at the correct frequency. An LCS is not required for the VOC analyses in accordance with USEPA CLP SOW method OLM03.1.

 $\underline{Surrogates:} \ \ The \ surrogate \ results \ were \ within \ laboratory \ specified \ limits \ without \ exception.$

Matrix Spike / Matrix Spike Duplicate: The MS/MSD results were within laboratory specified limits.

Precision

<u>Field Duplicates:</u> The relative percent difference (RPD) was calculated for those analytes that were detected above the reporting limit in both the field and field replicate samples. The RPD's were within an acceptable range.

<u>Laboratory Duplicate Sample:</u> The laboratory duplicate results were within laboratory specified limits without exception.

The overall results were acceptable, indicating that sampling and analytical precision objectives were met for the sampling event.

Completeness

The data package was complete for the requested analyses. No results were considered unusable. The completeness was 100 percent, which meets the completeness objective of 95 percent.

Representativeness:

Trip blank GWTB01-16 had a hit of Benzene below the reporting limit, likely attributable to high concentrations of ambient Benzene at the site or during shipping. All hits of Benzene in the samples were greater than ten times the trip blank concentration. No samples were qualified based on trip blank hits.

Field Blank GWFB01-16 had no target analytes detected above the reporting limit, for all analyses, indicating that the representativeness objectives for the sampling event were met.

Method blanks contained hits of Trichloroethene below the reporting limit. No hits of Trichloroethene were detected in the samples. No samples were qualified based on method blank hits.

Comparability:

All data were reported in similar units to facilitate comparison of results within the data packages. Samples arrived at the laboratory at 6°C, which is within the limits of 2-6°C. All holding times were met, indicating that the comparability objectives for the sampling event were met.

CONCLUSION

As a result of this evaluation, all data within this SDG are of known and acceptable quality in relation to the DQOs of this project. Data are considered usable as qualified for the intended purposes.

REFERENCES

Pre-Design Activities Quality Assurance Project Plan, American Chemical Service, Inc. NPL Site, Griffith Indiana (MW, 1995).

USEPA Contract Laboratory Program Statement of Work for Organic Analysis OLM03.1 (U.S. EPA August 1994).

USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis Multi-Media Multi-Concentration ILM04.1 (U.S. EPA February 2000).

National Functional Guidelines for Organic Data Review (U.S. EPA, 1994a).

National Functional Guidelines for Inorganic Data Review (U.S. EPA, 1994b).

ACS-NPL March 2001 Field Duplicate Comparisons SDG E1201

Parameter	Sample Result	Duplicate Result	RPD	Comments
SDG E1201	GWMW48-16	GWMW48-96		
Vinyl Chloride	ND	ND ·	0.00%	
chloroethane	78	85	8.97%	
1,1-Dichloroethene	ND	ND	0.00%	
trans-1,2-Dichloroethene	ND	ND .	0.00%	
cis-1,2-Dichloroethene	ND	ND	0.00%	
1,1,1-Trichloroethane	ND	ND	0.00%	
Benzene	2100	2300	9.52%	
Trichloroethene	ND	ND	0.00%	•
1,1,2-Trichloroethane	ND	ND	0.00%	
Tetrachloroethene	ND	ND	0.00%	
Arsenic	6.8	6.1	10.29%	
Lead	ND	ND .	0.00%	

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: COMPUCHEM

Contract: OLM04-REVS

GWMW06-16

Lab Code: LIBRTY Case No.: SAS No.:

SDG No.: E1201

Matrix: (soil/water) WATER

Lab Sample ID: E1201-2

Sample wt/vol: 5 (g/mL) ML

Lab File ID: E1201-2A55

Level: (low/med) LOW

Date Received: 03/30/01

% Moisture: not dec.

Date Analyzed: 04/04/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume:____(uL)

Soil Aliquot Volume: ____(uL)

CAS NO. COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L Q

75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	270	E
75-35-4	1,1-Dichloroethene	10	Ū
156-60-5	trans-1,2-Dichloroethene	10	Ū
71-55-6	1,1,1-Trichloroethane	10	Ü
156-59-2	cis-1,2-Dichloroethene	10	U
79-01-6	Trichloroethene	10	Ŭ
79-00-5	1,1,2-Trichloroethane	10	Ū
71-43-2	Benzene	660	E
127-18-4	Tetrachloroethene	10	U

VOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

GWMW06-16

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.: SAS No.:

SDG No.: E1201

Matrix: (soil/water) WATER

Lab Sample ID: E1201-2

Sample wt/vol: 5 (g/mL)

Lab File ID: E1201-2A55

Level: (low/med)

LOW

Date Received: 03/30/01

% Moisture: not dec. _____

Date Analyzed: 04/04/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: ____(uL)

Number TICs found: 16

Soil Aliquot Volume: ____(uL)

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/L

		 	· · · · · · · · · · · · · · · · · · ·	
CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 115-07-1	PROPENE	1.97	14	NJ
2. 593-70-4	METHANE, CHLOROFLUORO-	2.76		NJ
3. 590-19-2	1,2-BUTADIENE	4.69		NJ
4. 60-29-7	ETHER	5.03	64	NJ
5.	UNKNOWN	5.52	8	J
6. 108-20-3	DIISOPROPYL ETHER	7.33	8	NJ
7. 1066-40-6	SILANOL, TRIMETHYL-	8.13	6	NJ
8. 109-99-9	FURAN, TETRAHYDRO-	8.34	17	NJ
9. 111-43-3	DI-N-PROPYL ETHER	9.36	25	NJ
10. 352-93-2	DIETHYL SULFIDE	9.93	10	NJ
11.	UNKNOWN	_ 13.28	7	J
12. 95-47-6	BENZENE, 1,2-DIMETHYL-	13.39	290	
13. 541-85-5	3-HEPTANONE, 5-METHYL-	14.45	19	NJ
14. 19549-80-5	2-HEPTANONE, 4,6-DIMETHYL-	14.97	7	NJ
15. 496-11-7	INDANE	15.39	10	
16. 873-94-9	CYCLOHEXANONE, 3,3,5-TRIMETH	15.69	370	NJ
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22.	·			
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25.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GWMW06-16DL

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.: SAS No.:

SDG No.: E1201

Matrix: (soil/water) WATER

Lab Sample ID: E1201-2

Sample wt/vol: 5 (g/mL) ML

Lab File ID: E1201-2R2A55

Level: (low/med) LOW

Date Received: 03/30/01

% Moisture: not dec.

Date Analyzed: 04/05/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 10.0

Soil Extract Volume: ____(uL)

Soil Aliquot Volume: ____(uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/L Q

75-01-4	Vinyl Chloride	100	U
75-00-3	Chloroethane	270	D
75-35-4	1,1-Dichloroethene	100	Ū
156-60-5	trans-1,2-Dichloroethene	100	U
156-59-2	cis-1,2-Dichloroethene	100	U
71-55-6	1,1,1-Trichloroethane	100	U
71-43-2	Benzene	2000	D
79-01-6	Trichloroethene	100	Ū
79-00-5	1,1,2-Trichloroethane	100	U
127-18-4	Tetrachloroethene	100	Ū

1 F

VOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: E1201

Matrix: (soil/water) WATER Lab Sample ID: E1201-2

Lab Name: COMPUCHEM

Number TICs found: 3

Sample wt/vol: 5 (g/mL) ML Lab File ID: E1201-2R2A55

Level: (low/med) LOW Date Received: 03/30/01

% Moisture: not dec. _____ Date Analyzed: 04/05/01

GC Column: EQUITY624 ID: 0.53 (mm) Dilution Factor: 10.0

Soil Extract Volume: ____(uL) Soil Aliquot Volume: ____(uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

RTCAS NUMBER COMPOUND NAME EST. CONC. 5.04 72 JD UNKNOWN 2. 108-38-3 BENZENE, 1,3-DIMETHYL-13.38 290 NJD CYCLOHEXANONE, 3,3,5-TRIMETH 3. 873-94-9 15.67 240 NJD 4. 6. 10. $\overline{11}$. 12. 13. 14. 15. 16. 19. 23. 25. 26. 27. 28. 29. 30.

FORM I VOA-TIC

OLM04.2

EPA-CLP METALS

1

			INORGA	ANIC AN	ALYSIS DATA	SHEET	•			
								EPA	SAMPLE NO.	
b Name:	COMPUCH	EM		Contr	act:			GW	MW06-16	
ab Code:	LIBRTY	Case N	o.:		SAS No.:			— SDG No.:	E1201	
•	il/water)	_			Lab Sam	ple ID:	 E1201	2	-	
evel (low		LOW			Date Re					
•							20,00	, , ,		
Solids:	0.0	_							•	
		Concentr	ation Units	(ug/L	or mg/kg dry	weight	t):	UG/L		
}		CAS No	. Anal	lyte	Concentrat	ion	C Q	М		
ř		7440-38	3-2 Arse	enic		125	1	P		
,		7439-9	2-1 Leac	i .		1.7	ן ט	P		
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Color Be	fore: (COLORLESS	Clarity Be	fore:	CLEAR		Texture	:		
Color Af	ter: (COLORLESS	Clarity Af	ter:	CLEAR		Artifac	ts:		
Comments	::									

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GWMW48-16

Lab Name: COMPUCHEM

Matrix: (soil/water) WATER

Contract: OLM04-REVS

SDG No.: E1201

Lab Code: LIBRTY

Case No.:

SAS No.:

Lab Sample ID: E1201-6

Sample wt/vol: 5 (g/mL) ML

Lab File ID: E1201-6A55

Level: (low/med) LOW

Date Received: 03/30/01

% Moisture: not dec. _____

Date Analyzed: 04/06/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 10.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: ____(uL)

CAS NO.

COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

75-01-4	Vinyl Chloride	100	U
75-00-3	Chloroethane	78	J
75-35-4	1,1-Dichloroethene	100	Ū
156-60-5	trans-1,2-Dichloroethene	100	Ü
156-59-2	cis-1,2-Dichloroethene	100	Ŭ
71-55-6	1,1,1-Trichloroethane	100	U
71-43-2	Benzene	2100	E
79-01-6	Trichloroethene_	0	JB
79-00-5	1,1,2-Trichloroethane	100	Ü
127-18-4	Tetrachloroethene	100	U

1F

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.:

SAS No.:

SDG No.: E1201

EPA SAMPLE NO.

Matrix: (soil/water) WATER

Lab Sample ID: E1201-6

Sample wt/vol: 5 (g/mL) ML

Lab File ID: E1201-6A55

Level: (low/med) LOW

Date Received: 03/30/01

% Moisture: not dec. _____

Date Analyzed: 04/06/01

Dilution Factor: 10.0

Soil Extract Volume: ____(uL)

GC Column: EQUITY624 ID: 0.53 (mm)

Soil Aliquot Volume: ____(uL)

CONCENTRATION UNITS:

Number TICs found: 0

(ug/L or ug/Kg) UG/L

		1		1
CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.			=======================================	====
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2 <u>5.</u> 26.				
27.				
28.		<u> </u>	-	
29.				
30.				

FORM I VOA-TIC

OLM04.2

1A VOLATILE ORGANICS ANALYSIS DATA SHEET EPA SAMPLE NO.

Lab Name: COMPUCHEM

Contract: OLM04-REVS

GWMW48-16DL

Lab Code: LIBRTY Case No.:

SAS No.:

SDG No.: E1201

Matrix: (soil/water) WATER

Lab Sample ID: E1201-6

Sample wt/vol: 5 (g/mL) ML

Lab File ID: E1201-6DA55

Date Received: 03/30/01

Level: (low/med) LOW

Date Analyzed: 04/06/01

% Moisture: not dec. _____

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 16.7

Soil Extract Volume: ___ (uL)

Soil Aliquot Volume: ____(uL)

CAS NO.

COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L Q

75-01-4	Vinyl Chloride	170	U
75-00-3	Chloroethane	78	DJ
75-35-4	1,1-Dichloroethene	170	Ū
156-60-5	trans-1,2-Dichloroethene	170	U
156-59-2	cis-1,2-Dichloroethene	170	U
71-55-6	1,1,1-Trichloroethane	170	U
71-43-2	Benzene	2000	D .
79-01-6	Trichloroethene	170	Ū
79-00-5	1,1,2-Trichloroethane	170	Ū
127-18-4	Tetrachloroethene	170.	Ü

Lab Name: COMPUCHEM

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS GWMW48-16DL Contract: OLM04-REVS

EPA SAMPLE NO.

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: E1201

Matrix: (soil/water) WATER Lab Sample ID: E1201-6

Sample wt/vol: 5 (q/mL) ML Lab File ID: E1201-6DA55

Level: (low/med) LOW Date Received: 03/30/01

% Moisture: not dec. _____ Date Analyzed: 04/06/01

GC Column: EQUITY624 ID: 0.53 (mm) Dilution Factor: 16.7

Soil Aliquot Volume: ____(uL) Soil Extract Volume: ____(uL)

CONCENTRATION UNITS:

Number TICs found: 0 (ug/L or ug/Kg) UG/L

		T		
CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	=======================================	=======	=========	=====
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FORM I VOA-TIC

OLM04.2

EPA-CLP METALS

1

		1	INORGANIC AN	IALYSIS DATA SHE	ЕТ	EPA SAMPLE NO.
						GWMW48-16
ub Name:	COMPUCHEM		Cont			_
b Code:	LIBRTY	Case No.:		SAS No.:		DG No.: E1201
tri x (so	il/water):	WATER		Lab Sample I	D: <u>E1201</u> -	-6
vel (low	/med): I			Date Receive	d: <u>03/30/</u>	01
Solids:	0.0					
		Concentration	Units (ug/L	or mg/kg dry weig	jht):	UG/L
		CAS No.	Analyte	Concentration	СО	м
		7440-38-2	Arsenic	6.8	В	P
		7439-92-1	Lead	1.7	ן ט	P
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Color Be	efore: CO	LORLESS Cla	rity Before:	CLEAR	Texture:	
				CLEAD	3	·
Color Ai	rter: CO	LORLESS Cla	rity After:	CLEAR	Artifact	.s

Comments:

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GWMW48-96

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.:

SAS No.:

SDG No.: E1201

Matrix: (soil/water) WATER

Lab Sample ID: E1201-7

Sample wt/vol: 5 (g/mL) ML

CAS NO.

Lab File ID: E1201-7DA55

Level: (low/med) LOW

Date Received: 03/30/01

% Moisture: not dec. _____

Date Analyzed: 04/06/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 33.3

Soil Extract Volume: ____(uL)

COMPOUND

Soil Aliquot Volume: ____(uL)

CONCENTRATION UNITS: (uq/L or ug/Kg) UG/L Q

75-01-4	Vinyl Chloride	330	U
75-00-3	Chloroethane	85	J
75-35-4	1,1-Dichloroethene	330	U
156-60-5	trans-1,2-Dichloroethene	330	Ŭ
156-59-2	cis-1,2-Dichloroethene	330	Ū
71-55-6	1,1,1-Trichloroethane	330	Ū
71-43-2	Benzene	2300	
79-01-6	Trichloroethene	330	Ü
79 - 00-5	1,1,2-Trichloroethane	330	U
127-18-4	Tetrachloroethene	330	U

VOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

GWMW48-96

EPA SAMPLE NO.

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.: SAS No.:

SDG No.: E1201

Matrix: (soil/water) WATER

Lab Sample ID: E1201-7

Sample wt/vol: 5 (g/mL) ML

Lab File ID: E1201-7DA55

Level: (low/med) LOW

Number TICs found: 0

Date Received: 03/30/01

% Moisture: not dec.

Date Analyzed: 04/06/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 33.3

Soil Extract Volume: ____(uL)

Soil Aliquot Volume: ____(uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NUMBER COMPOUND NAME RTEST. CONC. Q ______ ---------===== 4. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 28. 29. 30.

FORM I VOA-TIC

OLM04.2

EPA-CLP METALS

INORGANIC ANALYSIS DATA SHEET

-			•					EPA	SAMPLE 1	10.
Name:	СОМРИСНЕМ		ntract:				GWI	GWMW48-96		
Lab Code:	LIBRTY	Case No.:		SAS No.:	_		s	DG No.:	E1201	
	oil/water):	WATER		Lab Sa	mple II): E	1201-	-7		
Level (low		WC		Date R		_	3/30/			
_	_	<u></u>		Date N		·· <u>o-</u>	37 307	<u> </u>		
Solids:	0.0								_	
_		Concentration	Units (ug/L	or mg/kg dr	y weig	ht):		UG/L		
I		CAS No.	Analyte	Concentra	tion	c	Q	м		
		CAS NO.	Analy ce	Concentra	CION					
1		7440-38-2	Arsenic	<u> </u>	6.1			P		
-		7439-92-1	Lead		1.7	ן ט		P		
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COLORLESS Clarity Before: Color After: COLORLESS Clarity After: CLEAR Artifacts: Comments:

CLEAR

Texture:

Color Before:

EPA SAMPLE NO.

Lab Name: COMPUCHEM Contract: OLM04-REVS

GWMW49-16

Lab Code: LIBRTY Case No.:

SAS No.:

SDG No.: E1201

Matrix: (soil/water) WATER

Lab Sample ID: E1201-8

Sample wt/vol:

5 (q/mL) ML

Lab File ID: E1201-8RA55

Level: (low/med) LOW

Date Received: 03/30/01

% Moisture: not dec.

Date Analyzed: 04/06/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 5.0

Soil Extract Volume:____(uL)

Soil Aliquot Volume: ____ (uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND

(ug/L or ug/Kg) <u>UG/L</u> Q

Vinyl Chloride	50	Ü
Chloroethane	120	
1,1-Dichloroethene	50	Ū
trans-1,2-Dichloroethene		Ŭ
cis-1,2-Dichloroethene	50	Ū
1,1,1-Trichloroethane	50	Ü
Benzene	900	
Trichloroethene	50	Ü
1,1,2-Trichloroethane	50	Ü
Tetrachloroethene	50	U
	Chloroethane 1,1-Dichloroethene trans-1,2-Dichloroethene cis-1,2-Dichloroethene 1,1,1-Trichloroethane Benzene Trichloroethene 1,1,2-Trichloroethane	Chloroethane 120 1,1-Dichloroethene 50 trans-1,2-Dichloroethene 50 cis-1,2-Dichloroethene 50 1,1,1-Trichloroethane 50 Benzene 900 Trichloroethene 50 1,1,2-Trichloroethane 50

VOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

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	GWMW49-16

EPA SAMPLE NO.

Contract: OLM04-REVS

GWMW49-16	

Lab Code: LIBRTY Case No.:

SAS No.:

SDG No.: E1201

Matrix: (soil/water) WATER

Lab Sample ID: E1201-8

Sample wt/vol: 5 (g/mL) ML

Lab File ID: E1201-8RA55

Level: (low/med) LOW

Date Received: 03/30/01

% Moisture: not dec.

Date Analyzed: 04/06/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 5.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: ____(uL)

CONCENTRATION UNITS:

Number TICs found: 0

(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND		RT	EST. CONC.	Q
1.	.=========		======	=========	====
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27.					
28.					
29. 30.		<u> </u>			

FORM I VOA-TIC

EPA-CLP METALS

1

INORGANIC ANALYSIS DATA SHEET

							- E	PA SAMPLE N	
b Name:	COMPUCHEM		c	Contract:			G	WMW49-16	
b Code:	LIBRTY	Case No.		SAS No.:	· 		SDG No	: <u>E1201</u>	
1	il/water):	WATER			ample II): E1201	8		
) vel (low,	/med): Lo	OW		Date	Received	1: 03/30	/01		
Solids:	_		tion Units (u	g/L or mg/kg (lry weig	•	UG/L		
		CAS No.	Analyte	Concentr	ation	C Q	м		
		7440-38-	2 Arsenie	c	7.8	В	P		
		7439-92-			1.7		P		
						1			
				·					
				`.		·			
							·		
Color Be	fore: COL	ORLESS	Clarity Befor	e: <u>CLEAR</u>		Texture	: _		
Color Af	ter: COL	ORLESS	Clarity After	: <u>CLEAR</u>	·	Artifac	ts:		

13

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GWTB01-16 Contract: OLM04-REVS

Lab Name: COMPUCHEM

Lab Code: LIBRTY Case No.:

SAS No.:

SDG No.: E1201

Matrix: (soil/water) WATER

Lab Sample ID: E1201-10

Sample wt/vol: 5

(g/mL) ML

Lab File ID: E1201-10A55

Level: (low/med) LOW

Date Received: 03/30/01

% Moisture: not dec. _____

Date Analyzed: 04/06/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume:____(uL)

Soil Aliquot Volume: ____(uL)

CAS NO.

COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

			_
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	Ŭ
75-35-4	1,1-Dichloroethene	10	Ū
156-60-5	trans-1,2-Dichloroethene	10	Ū
156-59-2	cis-1,2-Dichloroethene	10	U
71-55-6	1,1,1-Trichloroethane	10	U
71-43-2	Benzene	3	J
79-01-6	Trichloroethene	10	Ü
79-00-5	1,1,2-Trichloroethane	. 10	U
127-18-4	Tetrachloroethene	10	U

FORM I VOA-1

TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.:

SAS No.:

SDG No.: E1201

EPA SAMPLE NO.

Matrix: (soil/water) WATER

Lab Sample ID: E1201-10

Sample wt/vol: 5 (g/mL) ML

Lab File ID: E1201-10A55

Level: (low/med) LOW

Date Received: 03/30/01

% Moisture: not dec. _____

Date Analyzed: 04/06/01

Number TICs found: 0

Dilution Factor: 1.0

Soil Extract Volume: ____(uL)

GC Column: EQUITY624 ID: 0.53 (mm)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

RTCAS NUMBER COMPOUND NAME EST. CONC. $\overline{10}$. 11. <u>Tã.</u> 13. $\overline{14}$. 15. 16. 17. 19. 20. 21. 23. 24. 25. 26. 27. 28. 29. 30.

FORM I VOA-TIC

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GW	FΒ	01	_	1	6

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.: SAS No.:

SDG No.: E1201

Matrix: (soil/water) WATER

Lab Sample ID: E1201-9

Sample wt/vol: 5 (g/mL) ML

Lab File ID: E1201-9A55

Level: (low/med) LOW

Date Received: 03/30/01

% Moisture: not dec.

Date Analyzed: 04/06/01

Dilution Factor: 1.0

GC Column: EQUITY624 ID: 0.53 (mm)

Soil Extract Volume: ____(uL)

Soil Aliquot Volume: (uL)

CAS NO. COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L Q

75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-35-4	1,1-Dichloroethene	10	Ü
156-60-5	trans-1,2-Dichloroethene	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
71-55-6	1,1,1-Trichloroethane	10	Ü
71-43-2	Benzene	10	U
79-01-6	Trichloroethene	10	Ū
79-00-5	1,1,2-Trichloroethane	10	Ü
127-18-4	Tetrachloroethene	10	Ŭ

VOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

GWFB01-16

EPA SAMPLE NO.

SDG No.: E1201

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Matrix: (soil/water) WATER

Lab Sample ID: E1201-9

Sample wt/vol: 5 (g/mL)

ML

Lab Code: LIBRTY Case No.: SAS No.:

Lab File ID: E1201-9A55

Level: (low/med) LOW

Date Received: 03/30/01

% Moisture: not dec. _____

Date Analyzed: 04/06/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: ____(uL)

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/L Number TICs found: 0

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CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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EPA-CLP METALS

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		·	INORGANIC AN	IALYSIS DATA SHE	ET			ĘPA S	SAMPLE NO.
Name:	COMPlian	an e	Cont					GWF	301-16
	COMPUCHI						- L SDG N	ío.:	E1201
Code:	<u>LIBRTY</u> il/water):	Case No.: WATER		SAS No.: Lab Sample I		E1201			21201
									
el (low		LOW		Date Receive	a: <u>[</u>	3/30,	/01		·
olids:	0.0	_							
		Concentrati	on Units (ug/L	or mg/kg dry weig	nt):		UG/	L	
		CAS No.	Analyte	Concentration	c	Q	м	Ī	
		7440-38-2	Arsenic	4.2	<u> </u>		P	! [
		7439-92-1	·		ט		P	j	
					¥.				
	·						-		
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									•
				ř					
				<i>`</i>					
lor Be	fore: C	colorless cj	arity Before:	CLEAR	Te:	x ture	:		
olor Af	-		Larity After:	CLEAR		tifac			
TOT MI			arrey Arcer.	- Camaran	A.L	-LLac			

APPENDIX D

VALIDATION NARRATIVE AND LABORATORY REPORTS FROM LOWER AQUIFER

MEMORANDUM



To:

Chad Smith

Date: May 10, 2001

From:

Matthew Reeder

Subject:

Data Validation for American

Job No.: 2090603

Chemical Service (ACS).

SDG: F1201

Griffith, Indiana.

INTRODUCTION

The following text is based on the validation of water samples collected at American Chemical Service, Inc. in April 2001.

One water sample and three QA/QC samples were analyzed by CompuChem Laboratories, Cary, North Carolina for the following parameters:

SDG F1201 VOA, CLP-OLM 3.1, (samples: GWFB0216, GWMW5616, GWMW5696, GWTB0216)

Data validation was conducted in accordance with procedures specified in *Pre-Design Activities Quality Assurance Project Plan (MW, 1995), USEPA Contract Laboratory Program Statement of Work for Organic Analysis OLM03.1(U.S. EPA August 1994);* and was also based on principles outlined in *National Functional Guidelines for Organic Data Review (USEPA, 1994a).*

The following field quality control samples were collected during the April 2001 sampling round:

- One field blank (GWFB0216)
- One field duplicate (GWMW5696)
- One trip blank (GWTB0216)

This memorandum contains a narrative summarizing the data quality objectives specified in the work plan.

SUMMARY

This section describes the quality control parameters reviewed during validation, summarizes the data quality objectives as a result of the validation and provides a summary of the deficiencies.

Volatile Organic Compounds

Major Deficiencies: There were no major deficiencies identified during the validation process.

Minor Deficiencies: There were no minor deficiencies identified during the validation process.

DATA QUALITY OBJECTIVES

The following is a summary of the data quality objectives that were evaluated during the data validation process.

Reporting Limits: Reporting limits were met for all analyses without exception.

Accuracy

<u>Laboratory Control Sample:</u> An LCS is not required for the VOC analyses in accordance with USEPA CLP SOW method OLM03.1.

<u>Surrogates</u>: The surrogate results were within laboratory specified limits without exception.

Matrix Spike / Matrix Spike Duplicate: The MS/MSD results were within laboratory specified limits.

Precision

Field Duplicates: No analyte was detected in the field duplicate or parent sample.

The overall results were acceptable, indicating that sampling and analytical precision objectives were met for the sampling event.

Completeness

The data package was complete for the requested analyses. No results were considered unusable. The completeness was 100 percent, which meets the completeness objective of 95 percent.

Representativeness:

Trip blank GWTB0216 had no target analytes detected above the reporting limit, for all analyses, indicating that the representativeness objectives for the sampling event were met.

Field Blank GWFB0216 had no target analytes detected above the reporting limit, for all analyses, indicating that the representativeness objectives for the sampling event were met.

The method blank had no target analytes detected above the reporting limit.

Comparability:

All data were reported in similar units to facilitate comparison of results within the data packages. Samples arrived at the laboratory at 4°C, which is within the limits of 2-6°C. All holding times were met, indicating that the comparability objectives for the sampling event were met.

CONCLUSION

As a result of this evaluation, all data within this SDG are of known and acceptable quality in relation to the DQOs of this project. Data are considered usable as qualified for the intended purposes.

REFERENCES

Pre-Design Activities Quality Assurance Project Plan, American Chemical Service, Inc. NPL Site, Griffith Indiana (MW, 1995).

USEPA Contract Laboratory Program Statement of Work for Organic Analysis OLM03.1 (U.S. EPA August 1994).

National Functional Guidelines for Organic Data Review (U.S. EPA, 1994a).

ACS April 2001 Field Duplicate Comparisons SDG F1201

Parameter	Sample Result	Duplicate Result	RPD	Comments
SDG F1201	GWMW5616	GWMW5696		
Vinyl Chloride	ND	ND	0.00%	•
chloroethane	ND	ND	0.00%	
1,1-Dichloroethene	ND	ND	0.00%	
trans-1,2-Dichloroethene	ND	ND	0.00%	
cis-1,2-Dichloroethene	ND	ND	0.00%	
1,1,1-Trichloroethane	ND	ND	0.00%	
Benzene	ND	ND	0.00%	
Trichloroethene	ND	ND	0.00%	
1,1,2-Trichloroethane	ND	ND	0.00%	
Tetrachloroethene	ND	ND	0.00%	

EPA SAMPLE NO.

GWMW9R-16

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.:

SAS No.:

SDG No.: E1201

Matrix: (soil/water) WATER

Lab Sample ID: E1201-1

Sample wt/vol: 5 (g/mL) ML

Lab File ID: E1201-1A55

Level: (low/med) LOW

Date Received: 03/30/01

% Moisture: not dec.

Date Analyzed: 04/04/01

GC Column: EQUITY624 ID: 0.53 (mm)

Soil Extract Volume: (uL)

Dilution Factor: 1.0

Soil Aliquot Volume: __ (uL)

CAS NO. COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L Q

75-01-4	Vinyl Chloride	10	Ū
75-00-3	Chloroethane	530	E
75-35-4	1,1-Dichloroethene	10	U
156-60-5	trans-1,2-Dichloroethene	10	U
71-55-6	1,1,1-Trichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	10	Ŭ.
79-01-6	Trichloroethene	10	Ŭ
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	41	
127-18-4	Tetrachloroethene	10	U

VOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

GWMW9R-16

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.:

SAS No.:

SDG No.: E1201

Matrix: (soil/water) WATER

Lab Sample ID: E1201-1

Sample wt/vol: 5 (g/mL) ML

Lab File ID: E1201-1A55

Level: (low/med) LOW

Date Received: 03/30/01

% Moisture: not dec.

Date Analyzed: 04/04/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: ____(uL)

Soil Aliquot Volume: __ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

Number TICs found: 1

			 	
CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q =====
1. 111-43-3	DI-N-PROPYL ETHER	9.34	l l	NJ
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FORM I VOA-TIC

EPA SAMPLE NO.

GWMW9R-16DL

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY

Case No.: SAS No.:

SDG No.: E1201

Matrix: (soil/water) WATER

Lab Sample ID: E1201-1

Sample wt/vol: 5 (g/mL) ML

Lab File ID: E1201-1D4A55

Level: (low/med) LOW

CAS NO. COMPOUND

Date Received: 03/30/01

% Moisture: not dec.

Date Analyzed: 04/05/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 3.3

Soil Extract Volume: ____(uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L Q

75-01-4	Vinyl Chloride	33	Ū
75-00-3	Chloroethane	360	D
75-35-4	1,1-Dichloroethene	33	U
156-60-5	trans-1,2-Dichloroethene	33	Ū
156-59-2	cis-1,2-Dichloroethene	33	Ŭ
71-55-6	1,1,1-Trichloroethane	33	Ū
71-43-2	Benzene	27	DJ
79-01-6	Trichloroethene	33	Ū
79-00-5	1,1,2-Trichloroethane	33	Ŭ
127-18-4	Tetrachloroethene	33_	Ŭ

VOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

GWMW9R-16DL

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.:

LOW

SAS No.:

SDG No.: E1201

Matrix: (soil/water) WATER

Lab Sample ID: E1201-1

Sample wt/vol: 5 (g/mL)

 ${ t ML}$

Lab File ID: E1201-1D4A55

Level: (low/med)

Date Received: 03/30/01

% Moisture: not dec. _____

Date Analyzed: 04/05/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 3.3

Soil Extract Volume: ____(uL)

CONCENTRATION UNITS:

Soil Aliquot Volume: (uL)

Number TICs found: 0

(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1		======	=======================================	=====
<u>1.</u>				
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FORM I VOA-TIC

EPA-CLP METALS

1

		1	INORGANIC AI	NALYSIS DATA SHEF	T		EPA SAMPLE NO.
- h . W :			~ .			Ī	GWMW9R-16
ab Name:	COMPUCHEM			ract:		L SDG M	o.: E1201
ab Code:	LIBRTY	Case No.:					<u>E1201 </u>
	il/water):	WATER	-	Lab Sample II		201-1	
evel (low	/med): <u>L</u>	OW		Date Receive	d: 03/	/30/01	
Solids:	0.0						
		Concentration	Units (ug/L	or mg/kg dry weig	ht):	UG/1	<u></u>
		CAS No.	Analyte	Concentration	c	О М	,
		7440-38-2	Arsenic	4.2	ן ט	P	
		7439-92-1	Lead	1.7	ן ט	P	
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Comments:

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GWMW10C-16

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY

Case No.:

SAS No.:

SDG No.: E1201

Matrix: (soil/water) WATER

Lab Sample ID: E1201-3

Sample wt/vol: 5 (g/mL) ML

Lab File ID: E1201-3A55

Level: (low/med) LOW

Date Received: 03/30/01

% Moisture: not dec.

Date Analyzed: 04/04/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/L Q

Soil Extract Volume:____(uL)

Soil Aliquot Volume: (uL)

CAS NO. COMPOUND

10 190	Ū	
10	Ū	
10	U	
10	Ū	
10	U	

75-01-4	Vinyl Chloride	10	Ū
75-00-3	Chloroethane	190	
75-35-4	1,1-Dichloroethene	10	U
156-60 - 5	trans-1,2-Dichloroethene	10	_ U
71-55-6	1,1,1-Trichloroethane	10	Ū
156-59-2	cis-1,2-Dichloroethene	10	ַ ַ ַ
79-01-6	Trichloroethene	10	Ū
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	420	E
127-18-4	Tetrachloroethene	10	Ū

FORM I VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

GWMW10C-16

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.: SAS No.:

SDG No.: E1201

Matrix: (soil/water) WATER

Lab Sample ID: E1201-3

Sample wt/vol: 5 (q/mL) ML

Lab File ID: E1201-3A55

Level: (low/med)

LOW

Date Received: 03/30/01

% Moisture: not dec.

Date Analyzed: 04/04/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: ____(uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

Number TICs found: 4

(ug/L or ug/Kg) UG/L

				
CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1	UNKNOWN	5.04	1200	J====
1. 2. 109-99-9	FURAN, TETRAHYDRO-	8.35	56	N.T
3. 123-91-1	1.4-DIOXANE	10.40		NJ
4. 873-94-9	1,4-DIOXANE CYCLOHEXANONE, 3,3,5-TRIMETH	15.69	23	
5.	010201212121217 07070 221112			
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EPA SAMPLE NO.

GWMW10C-16DL -

Lab Name: COMPUCHEM

Contract: OLM04-REVS

ame. Confidence. Offi

Lab Code: LIBRTY Case No.: SAS No.:

SDG No.: E1201

Matrix: (soil/water) WATER

Lab Sample ID: E1201-3

Sample wt/vol: 5 (g/mL) ML

Lab File ID: E1201-3DA55

Level: (low/med) LOW

CAS NO. COMPOUND

Date Received: 03/30/01

% Moisture: not dec.

Date Analyzed: 04/05/01

Dilution Factor: 3.3

Soil Extract Volume:____(uL)

GC Column: EQUITY624 ID: 0.53 (mm)

Soil Aliquot Volume: ____(uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L Q

75-01-4	Vinyl Chloride	33	Ū
75-00-3	Chloroethane	200	D
75-35-4	1,1-Dichloroethene	33	Ū
156-60-5	trans-1,2-Dichloroethene	33	U
156-59-2	cis-1,2-Dichloroethene	. 33	Ū
71-55-6	1,1,1-Trichloroethane	33	U
71-43-2	Benzene	410	D
79-01-6	Trichloroethene	33	Ū
79-00-5	1,1,2-Trichloroethane	33	Ū
127-18-4	Tetrachloroethene	33	Ū

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

Contract: OLM04-REVS

GWMW10C-16DL

Lab Name: COMPUCHEM

Lab Code: LIBRTY Case No.: SAS No.:

SDG No.: E1201

Matrix: (soil/water) WATER

Lab Sample ID: E1201-3

Sample wt/vol: 5 (q/mL) ML

Lab File ID: E1201-3DA55

Level: (low/med)

LOW

Date Received: 03/30/01

% Moisture: not dec.

Date Analyzed: 04/05/01

Dilution Factor: 3.3

Soil Extract Volume: ____(uL)

Soil Aliquot Volume: (uL)

GC Column: EQUITY624 ID: 0.53 (mm)

CONCENTRATION UNITS:

Number TICs found: 2 (ug/L or ug/Kg) UG/L

		r		
CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 60-29-7	ETHER	5.03	2600	N TO
2. 109-99-9	FURAN, TETRAHYDRO-	8.35	2600	NJD
3.	FORMY, TETRAHIDRO-	0.33	- 04	NOD
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EPA SAMPLE NO.

Lab Name: COMPUCHEM

Contract: OLM04-REVS

GWATMW4D-16

Lab Code: LIBRTY Case No.: SAS No.:

SDG No.: E1201

Matrix: (soil/water) WATER

Lab Sample ID: E1201-5

CAS NO

Sample wt/vol: 5 (q/mL) ML

Lab File ID: E1201-5A55

Level· (low/med) LOW

Date Received: 03/30/01

% Moisture: not dec. _____

Date Analyzed: 04/06/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 10.0

Soil Extract Volume: ____(uL)

COMPOUND

127-18-4 Tetrachloroethene

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L O

100

CAS NO.	COMPOUND	(ug/11 or ug/kg) <u>og/11</u> Q
75-01-4	Vinyl Chloride	100 U
75-00-3	Chloroethane	42 J
75-35-4	1,1-Dichloroethene	100 U
156-60-5	trans-1,2-Dichloroethene	100 U
156-59-2	cis-1,2-Dichloroethene	100 U
71-55-6	1,1,1-Trichloroethane	100 U
71-43-2	Benzene	1800
79-01-6	Trichloroethene	100 U
79-00-5	1,1,2-Trichloroethane	100 U

FORM I VOA-1

VOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

GWATMW4D-16

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.: SAS No.:

SDG No.: E1201

EPA SAMPLE NO.

Matrix: (soil/water) WATER

Lab Sample ID: E1201-5

Sample wt/vol: 5 (g/mL) ML

Lab File ID: E1201-5A55

Level: (low/med) LOW

Date Received: 03/30/01

% Moisture: not dec. _____

Date Analyzed: 04/06/01

GC Column: EQUITY624 ID: 0.53 (mm)

Number TICs found: 0

Dilution Factor: 10.0

Soil Aliquot Volume: ____(uL)

Soil Extract Volume: ____(uL)

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
		======	=======================================	·=====
2.				
3.		-		
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FORM I VOA-TIC

EPA SAMPLE NO.

Lab Name: COMPUCHEM Contract: OLM04-REVS ACSGWMW5616

Lab Code: LIBRTY Case No.: SAS No.:

SDG No.: F1201

Matrix: (soil/water) WATER

Lab Sample ID: F1201-1

Sample wt/vol: 5 (g/mL) ML

Lab File ID: F1201-1A51

Level: (low/med) LOW

Date Received: 04/20/01

% Moisture: not dec. _____

Date Analyzed: 04/25/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____(uL)

Soil Aliquot Volume: (uL)

CAS NO. COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L Q

5' 1' 5'	10	T 7
		U
	10	U
	10	U
Bromomethane	10	U
Chloroethane	10	U
Trichlorofluoromethane	10	Ŭ
1,1-Dichloroethene	10	Ŭ
1,1,2-Trichloro-1,2,2-trifluoroethane	10	Ü
Acetone	10	В
Carbon Disulfide	10	U
Methyl Acetate	10	U
Methylene Chloride	10	JB
trans-1,2-Dichloroethene	10	U
Methyl tert-Butyl Ether	10	Ū
1,1-Dichloroethane	10	U
cis-1,2-Dichloroethene	10	Ū
2-Butanone	10	U
Chloroform	3	JB
1,1,1-Trichloroethane	10	U
Cyclohexane	10	U
Carbon Tetrachloride	10	Ū
Benzene	10	Ū
1,2-Dichloroethane	10	U
	Trichlorofluoromethane 1,1-Dichloroethene 1,1,2-Trichloro-1,2,2-trifluoroethane Acetone Carbon Disulfide Methyl Acetate Methylene Chloride trans-1,2-Dichloroethene Methyl tert-Butyl Ether 1,1-Dichloroethane cis-1,2-Dichloroethene 2-Butanone Chloroform 1,1,1-Trichloroethane Cyclohexane Carbon Tetrachloride Benzene	Chloromethane 10 Vinyl Chloride 10 Bromomethane 10 Chloroethane 10 Trichlorofluoromethane 10 1,1-Dichloroethene 10 1,1,2-Trichloro-1,2,2-trifluoroethane 10 Acetone 10 Carbon Disulfide 10 Methyl Acetate 10 Methylene Chloride 10 trans-1,2-Dichloroethene 10 Methyl tert-Butyl Ether 10 1,1-Dichloroethane 10 cis-1,2-Dichloroethene 10 2-Butanone 10 Chloroform 3 1,1,1-Trichloroethane 10 Cyclohexane 10 Carbon Tetrachloride 10 Benzene 10

FORM I VOA-1

EPA SAMPLE NO.

ACSGWMW5616

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.:

SAS No.:

SDG No.: F1201

Matrix: (soil/water) WATER

Lab Sample ID: F1201-1

Sample wt/vol: 5 (q/mL) ML

Lab File ID: F1201-1A51

Level: (low/med) LOW

Date Received: 04/20/01

% Moisture: not dec. _____

Date Analyzed: 04/25/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CAS NO. COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L Q

Trichloroethene Methylcyclohexane 1,2-Dichloropropane Bromodichloromethane cis-1,3-Dichloropropene	10 10 10 10	U U U
1,2-Dichloropropane Bromodichloromethane	10	Ū
Bromodichloromethane		
	10	
cig-1 3-Dichloropropene		Ū
	10	U
4-Methyl-2-Pentanone	10	Ū
	1	JB
trans-1,3-Dichloropropene	10	U
	10	U
Tetrachloroethene	10	Ū
2-Hexanone	10	U
	10	Ū
	10	Ū
	10	Ŭ
	10	Ü
	10	U
Styrene	10	Ŭ
	10	U
		U
	10	Ū
	10	U
	10	U
1,2-Dichlorobenzene	10	U
	10	U
1,2,4-Trichlorobenzene	10	U
	Toluene trans-1,3-Dichloropropene 1,1,2-Trichloroethane Tetrachloroethene 2-Hexanone Dibromochloromethane 1,2-Dibromoethane Chlorobenzene Ethylbenzene Xylene (Total) Styrene Bromoform Isopropylbenzene 1,1,2,2-Tetrachloroethane 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene 1,2-Dichlorobenzene 1,2-Dibromo-3-Chloropropane	Toluene 1 trans-1,3-Dichloropropene 10 1,1,2-Trichloroethane 10 Tetrachloroethene 10 2-Hexanone 10 Dibromochloromethane 10 1,2-Dibromoethane 10 Ethylorobenzene 10 Ethylbenzene 10 Styrene 10 Bromoform 10 Isopropylbenzene 10 1,2,2-Tetrachloroethane 10 1,3-Dichlorobenzene 10 1,4-Dichlorobenzene 10 1,2-Dichlorobenzene 10 1,2-Dichlorobenzene 10 1,2-Dichlorobenzene 10 1,2-Dichlorobenzene 10 1,2-Dichlorobenzene 10 1,2-Dibromo-3-Chloropropane 10

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

SAS No.:

ACSGWMW5616

EPA SAMPLE NO.

Lab Code: LIBRTY Case No.:

Contract: OLM04-REVS

SDG No.: F1201

Matrix: (soil/water) WATER

Lab Sample ID: F1201-1

Lab Name: COMPUCHEM

Sample wt/vol: 5 (g/mL) ML

Lab File ID: F1201-1A51

Level: (low/med) LOW

Date Received: 04/20/01

% Moisture: not dec. _____

Date Analyzed: 04/25/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: ___ (uL)

Number TICs found: 4

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NUMBER RTEST. CONC. COMPOUND NAME ======= 7 NJB 1. 60-29-7 ETHER 6.06 2. 556-67-2 14.58 54 NJB CYCLOTETRASILOXANE, OCTAMETH LABORATORY ARTIFACT 15.86 43 JB LABORATORY ARTIFACT 17.02 21 JB 9. 10. $\overline{11}$. 12. 13. 14. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 28. 29.

FORM I VOA-TIC

EPA SAMPLE NO.

ACSGWMW5696

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.:

SAS No.:

SDG No.: F1201

Matrix: (soil/water) WATER

Lab Sample ID: F1201-2

Sample wt/vol: 5 (q/mL) ML

Lab File ID: F1201-2A51

Date Received: 04/20/01

Level: (low/med) LOW

Date Analyzed: 04/25/01

% Moisture: not dec. _____ GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: ____(uL)

Soil Aliquot Volume: ____(uL)

CAS NO. COMPOUND

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L Q

75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	Ŭ
67-64-1	Acetone	7	JB
75-15-0	Carbon Disulfide	10	U
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	7	JB
156-60-5	trans-1,2-Dichloroethene	10	Ŭ
1634-04-4	Methyl tert-Butyl Ether	10	U
75-34-3	1,1-Dichloroethane	10	Ŭ
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	2	JB
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	Ŭ
56-23-5	Carbon Tetrachloride	10	Ū
71-43-2	Benzene	10	Ū
107-06-2	1,2-Dichloroethane	10	U

EPA SAMPLE NO.

ACSGWMW5696

Lab Name: COMPUCHEM

Contract: OLM04-REVS

SAS No.:

SDG No.: F1201

Lab Code: LIBRTY Case No.:

Lab Sample ID: F1201-2

Matrix: (soil/water) WATER

Sample wt/vol: 5 (g/mL) ML

Lab File ID: F1201-2A51

Level: (low/med) LOW

Date Received: 04/20/01

% Moisture: not dec. _____

Date Analyzed: 04/25/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: ____(uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/L Q

79-01-6	Trichloroethene	1.0	Ū
		10	U
108-87-2	Methylcyclohexane		
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	10_	U
10061-01-5	cis-1,3-Dichloropropene	10	Ü
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	1	JB
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	Ū
591-78-6	2-Hexanone	10	Ū
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	Ū
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	Ū
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	Ū
96-12-8	1,2-Dibromo-3-Chloropropane	10	Ū
120-82-1	1,2,4-Trichlorobenzene	10	Ū
· — ==			

VOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SDG No.: F1201

Contract: OLM04-REVS

ACSGWMW5696

Lab Name: COMPUCHEM Contract: OLM04-REVS _____
Lab Code: LIBRTY Case No.: SAS No.: SD0

Matrix: (soil/water) WATER Lab Sample ID: F1201-2

Sample wt/vol: 5 (q/mL) ML Lab File ID: F1201-2A51

Level: (low/med) LOW Date Received: 04/20/01

% Moisture: not dec. ____ Date Analyzed: 04/25/01

GC Column: EQUITY624 ID: 0.53 (mm) Dilution Factor: 1.0

Number TICs found: 4

24. 25. 26. 27. 28. 29.

Soil Extract Volume: ____ (uL) Soil Aliquot Volume: ____ (uL)

CONCENTRATION UNITS: (uq/L or uq/Kq) UG/L

RT EST. CONC. CAS NUMBER COMPOUND NAME 7 NJB 1. 60-29-7 6.07 ETHER 75 NJB 2. 556-67-2 CYCLOTETRASILOXANE, OCTAMETH 14.60 LABORATORY ARTIFACT LABORATORY ARTIFACT 15.87 40 JB 17.04 8 JB 6. 9. 10. 13. 17. 18. <u> 19.</u> 20. 21. 22. 23.

FORM I VOA-TIC

EPA SAMPLE NO.

ACSGWMW5616MS

Lab Name: COMPUCHEM

Contract: OLM04-REVS

SDG No.: F1201

Lab Code: LIBRTY Case No.: SAS No.:

Matrix: (soil/water) WATER

Lab Sample ID: WG9786-4

Sample wt/vol: 5 (g/mL) ML

Lab File ID: WG9786-4A51

Level: (low/med) LOW

Date Received: 04/20/01

% Moisture: not dec.

CAS NO. COMPOUND

Date Analyzed: 04/25/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: ____(uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L Q

75-71-8 Dichlorodifluoromethane 10 74-87-3 | Chloromethane 1.0 75-01-4 | Vinyl Chloride 10 IJ 74-83-9 Bromomethane 10 75-00-3 Chloroethane 10 75-69-4 Trichlorofluoromethane 10 U 75-35-4 1,1-Dichloroethene 51 1,1,2-Trichloro-1,2,2-trifluoroethane 76-13-1 67-64-1 Acetone 11 Carbon Disulfide Methyl Acetate 75-15-0 79-20-9 10 U 75-09-2 Methylene Chloride JB 156-60**-**5 trans-1,2-Dichloroethene Ū 1634-04-4 Methyl tert-Butyl Ether 10 IJ 1,1-Dichloroethane 75-34-3 10 156-59-2 cis-1,2-Dichloroethene 10 78-93-3 2-Butanone 10 IJ 67-66-3 Chloroform JB 1,1,1-Trichloroethane 71-55-6 10 110-82-7 Cyclohexane 10 U 56-23-5 Carbon Tetrachloride 10 Ū 71-43-2 Benzene 51 1,2-Dichloroethane 107-06-2

FORM I VOA-1

EPA SAMPLE NO.

ACSGWMW5616MS

Lab Name: COMPUCHEM

Contract: OLM04-REVS

SDG No.: F1201

Lab Code: LIBRTY Case No.: SAS No.:

Matrix: (soil/water) WATER

Lab Sample ID: WG9786-4

Sample wt/vol: 5 (g/mL) ML

Lab File ID: WG9786-4A51

Level: (low/med) LOW

Date Received: 04/20/01

% Moisture: not dec. _____

Date Analyzed: 04/25/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/L Q

70 01 6	Twichloweethere	50	r !
79-01-6	Trichloroethene		
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	Ü
75-27-4	Bromodichloromethane	10	Ŭ
10061-01-5	cis-1,3-Dichloropropene	10	Ü
108-10-1	4-Methyl-2-Pentanone	10	Ŭ
108-88-3	Toluene	50	В
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	Ŭ
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	50	
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	Ŭ _
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene ·	10	U
95-50-1	1,2-Dichlorobenzene	10	Ü
96-12-8	1,2-Dibromo-3-Chloropropane	10	U
120-82-1	1,2,4-Trichlorobenzene	10	Ü

EPA SAMPLE NO.

ACSGWMW5616MSD

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.: SAS No.:

SDG No.: F1201

Matrix: (soil/water) WATER

Lab Sample ID: WG9786-5

Sample wt/vol: 5 (g/mL) ML

Lab File ID: WG9786-5A51

Date Received: 04/20/01

Level: (low/med) LOW

Date Analyzed: 04/25/01

% Moisture: not dec.

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: ____(uL)

CONCENTRATION UNITS: (uq/L or uq/Kq) UG/L Q

G1 G 170		CONCENTRATION ONTI	
CAS NO.	COMPOUND .	(ug/L or ug/Kg) <u>UG</u>	<u>/L</u> Q
75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	10	U
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	10	Ü
75-00-3	Chloroethane	10	Ü
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	50	
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U
67-64-1	Acetone	9	JB
75-15-0	Carbon Disulfide	10	Ū
79-20-9	Methyl Acetate	10	Ū
75-09-2	Methylene Chloride	5	JB
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	10	U
75-34-3	1,1-Dichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U_
78-93-3	2-Butanone	10	Ū
67-66-3	Chloroform	1	JB
71-55-6	1,1,1-Trichloroethane	10	U
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	51	
107-06-2	1,2-Dichloroethane	10	Ū

FORM I VOA-1

EPA SAMPLE NO.

ACSGWMW5616MSD

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.: SAS No.:

SDG No.: F1201

Matrix: (soil/water) WATER

Lab Sample ID: WG9786-5

Sample wt/vol: 5 (g/mL) ML

Lab File ID: WG9786-5A51

Level: (low/med) LOW

CAS NO. COMPOUND

Date Received: 04/20/01

% Moisture: not dec.

Date Analyzed: 04/25/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume:____(uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L Q

79-01-6 Trichloroethene 51 108-87-2 Methylcyclohexane 78-87-5 | 1,2-Dichloropropane 10 IJ 75-27-4 Bromodichloromethane 10 U 10061-01-5 cis-1,3-Dichloropropene 10 108-10-1 4-Methyl-2-Pentanone 10 108-88-3 | Toluene 50 10061-02-6 trans-1,3-Dichloropropene 10 79-00-5 1,1,2-Trichloroethane 10 127-18-4 Tetrachloroethene 10 591-78-6 2-Hexanone 10 U 124-48-1 Dibromochloromethane 10 U 1,2-Dibromoethane 106-93-4 10 Ū Chlorobenzene 108-90-7 100-41-4 Ethylbenzene 10 1330-20-7 Xylene (Total) 10 100-42-5 Styrene 10 IJ 75-25-2 Bromoform 10 Ū 98-82-8 Isopropylbenzene Ū 1.0 1,1,2,2-Tetrachloroethane 79-34-5 10 П 541-73-1 1,3-Dichlorobenzene IJ 1.0^{-1} 106-46-7 1,4-Dichlorobenzene 10 TT 95-50-1 1,2-Dichlorobenzene 1.0 Π 96-12-8 1,2-Dibromo-3-Chloropropane 10 U 120-82-1 1,2,4-Trichlorobenzene 10 U

FORM I VOA-2

EPA SAMPLE NO.

ACSGWTB0216

Lab Name: COMPUCHEM Contract: OLM04-REVS

Lab Code: LIBRTY Case No.: SAS No.:

SDG No.: F1201

Matrix: (soil/water) WATER

Lab Sample ID: F1201-3

Sample wt/vol: 5 (g/mL) ML

Lab File ID: F1201-3A51

Level: (low/med) LOW

Date Received: 04/20/01

% Moisture: not dec. _____

Date Analyzed: 04/25/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: ____(uL)

Soil Aliquot Volume: ____(uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L Q

CAS NO. COMPOUND

75-71-8	Dichlorodifluoromethane	10	Ü
74-87-3	Chloromethane	10	Ū
75-01-4	Vinyl Chloride	10	Ū
74-83-9	Bromomethane	10	U
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
75-35-4	1,1-Dichloroethene	10	Ü
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10	U -
67-64-1	Acetone	8	JB
75-15-0	Carbon Disulfide	10	U
79-20-9	Methyl Acetate	10	U
75-09-2	Methylene Chloride	7	JB
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl tert-Butyl Ether	10	U
75-34-3	l,1-Dichloroethane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	10	U
67-66-3	Chloroform	2	JB
71-55-6	1,1,1-Trichloroethane	10	Ū
110-82-7	Cyclohexane	10	U
56-23-5	Carbon Tetrachloride	10	U
71-43-2	Benzene	10	U
107-06-2	1.2-Dichloroethane	10	IJ

FORM I VOA-1

EPA SAMPLE NO.

ACSGWTB0216

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.: SAS No.:

1,2,4-Trichlorobenzene

SDG No.: F1201

Matrix: (soil/water) WATER

Lab Sample ID: F1201-3

Sample wt/vol: 5 (q/mL) ML

Lab File ID: F1201-3A51

Level: (low/med) LOW

Date Received: 04/20/01

% Moisture: not dec.

Date Analyzed: 04/25/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: ____(uL)

Soil Aliquot Volume: ____(uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/L Q 79-01-6 10 U Trichloroethene 108-87-2 Methylcyclohexane 10 78-87-5 1,2-Dichloropropane 10 U

	1,2 Dichiolopiopane	10	
75-27-4	Bromodichloromethane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	U
591-78-6	2-Hexanone	10	Ū
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	Ū
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
96-12-8	1,2-Dibromo-3-Chloropropane	10	U
100 00 1	1 0 4 5	1 1 1	77

FORM I VOA-2

TENTATIVELY IDENTIFIED COMPOUNDS

ACSGWTB0216

Lab Name: COMPUCHEM Contract: OLM04-REVS

Lab Code: LIBRTY Case No.:

SAS No.:

SDG No.: F1201

EPA SAMPLE NO.

Matrix: (soil/water) WATER

Lab Sample ID: F1201-3

Sample wt/vol: 5 (g/mL) ML

Lab File ID: F1201-3A51

Level: (low/med) LOW

Date Received: 04/20/01

% Moisture: not dec.

Date Analyzed: 04/25/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: ____(uL)

Soil Aliquot Volume: ____(uL)

CONCENTRATION UNITS:

Number TICs found: 3

(ug/L or ug/Kg) UG/L

CAC ATTACACA	COMPONE AND	ъ.	DOM GOVE	
CAS NUMBER	COMPOUND NAME	RT ======	EST. CONC.	Q =====
1. 556-67-2	CYCLOTETRASILOXANE, OCTAMETH	14.59	48	NJB
2.	LABORATORY ARTIFACT	15.87	55	
3.	LABORATORY ARTIFACT	17.03	27	JB
4. 5.				<u> </u>
6.				1
7.				
8.	-			
9.				
10.			**	
11.		_		
12.				
14.				
15.				1
16.			:	
17.				
18.				
19.				1
20.				<u> </u>
22.				<u> </u>
23.				
24.				
25.				
26.				
27.				
28.				<u> </u>
29.				1
30.				

FORM I VOA-TIC

EPA SAMPLE NO.

Contract: OLM04-REVS

ACSGWFB0216

Lab Name: COMPUCHEM

Lab Code: LIBRTY Case No.:

SAS No.:

SDG No.: F1201

Matrix: (soil/water) WATER

Lab Sample ID: F1201-4

Sample wt/vol: 5 (g/mL) ML

Lab File ID: F1201-4A51

Level: (low/med) LOW

Date Received: 04/20/01

% Moisture: not dec.

Date Analyzed: 04/25/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume:____(uL)

Soil Aliquot Volume: ____(uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L O

CAS NO.	COMPOUND	(ug/L or ug/Kg) <u>UG/L</u> Q
75-71-8	Dichlorodifluoromethane	10 U
74-87-3	Chloromethane	10 U
75-01-4	Vinyl Chloride	10 U
74-83-9	Bromomethane	10 U
75-00-3	Chloroethane	10 U
75-69-4	Trichlorofluoromethane	10 U
75-35-4	1,1-Dichloroethene	10 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	10 U
67-64-1	Acetone	6 JB
75-15-0	Carbon Disulfide	10 Ü
79-20-9	Methyl Acetate	10 U
75-09-2	Methylene Chloride	9 JB
156-60-5	trans-1,2-Dichloroethene	10 U
1634-04-4	Methyl tert-Butyl Ether	10 U
75-34-3	1,1-Dichloroethane	10 U
156-59-2	cis-1,2-Dichloroethene	10 U
78-93-3	2-Butanone	10 U
67-66-3	Chloroform	6 JB
71-55-6	1,1,1-Trichloroethane	10 U
110-82-7	Cyclohexane	10 U
56-23-5	Carbon Tetrachloride	10 U
71-43-2	Benzene	2 J
107-06-2	1,2-Dichloroethane	10 Ü

FORM I VOA-1

EPA SAMPLE NO.

ACSGWFB0216

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.: SAS No.:

SDG No.: F1201

Matrix: (soil/water) WATER

Lab Sample ID: F1201-4

Sample wt/vol: 5 (g/mL) ML

Lab File ID: F1201-4A51

Level: (low/med) LOW

Date Received: 04/20/01

% Moisture: not dec. _____

Date Analyzed: 04/25/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume:____(uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L Q ·

CAS NO. COMPOUND

79-01-6	Trichloroethene	10	U
108-87-2	Methylcyclohexane	10	U
78-87-5	1,2-Dichloropropane	10	U
75-27-4	Bromodichloromethane	4	J
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-Pentanone	10	Ü
108-88-3	Toluene	1	JB
10061-02-6	trans-1,3-Dichloropropene	10	U
79-00-5	1,1,2-Trichloroethane	10	Ŭ
127-18-4	Tetrachloroethene	10	U
591-78-6	2-Hexanone	10	U
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	Ū
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (Total)	10	Ŭ
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	Ŭ
98-82-8	Isopropylbenzene	10	Ū
79-34-5	1,1,2,2-Tetrachloroethane	10	U
541-73-1	1,3-Dichlorobenzene	10	Ü
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
96-12-8	1,2-Dibromo-3-Chloropropane	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U

FORM I VOA-2

VOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

1	
Į.	
	ACSGWFR0216

EPA SAMPLE NO.

Lab Name: COMPUCHEM

Contract: OLM04-REVS

Lab Code: LIBRTY Case No.:

SAS No.:

SDG No.: F1201

Matrix: (soil/water) WATER

Lab Sample ID: F1201-4

Sample wt/vol: 5 (g/mL) ML

Lab File ID: F1201-4A51

Level: (low/med) LOW

Date Received: 04/20/01

% Moisture: not dec.

Date Analyzed: 04/25/01

GC Column: EQUITY624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: ____(uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

Number TICs found: 4

				<u> </u>
CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
		=======	==========	=====
1. 60-29-7	ETHER	6.06	5	NJB
2. 556-67-2	CYCLOTETRASILOXANE, OCTAMETH	14.57		NJB
3.	LABORATORY ARTIFACT	15.85	36	JB
4.	LABORATORY ARTIFACT	17.01	10	JB
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